48120 November 1986 $2.50

MODEL AIRPLANE NEWS

THE WORLD'S PREMIER R/C MODELING MAGAZINE

Canada $3.25

You can build a FOCKE-WULF

How to Install RADIO GEAR

R/C is Fun!

The GIANT HOTS

71896 48120 11

MODEL AIRPLANE NEWS

ABOVE: The Hots family portrait, a tradition of great-flying fun-type airplanes. See the story of the Big Hots on p. 16.
ON THE COVER: A symbol of German airpower during WW II, this Fw 190F-8 was recovered by Allied forces in 1945 and restored by the Smithsonian Institute, where it is on permanent display. Photos courtesy of the Smithsonian. See Budd Davisson's story on p. 66 and a Field & Bench Review on Hobby Shack's EZ kit on p. 56.

FEATURES

CONSTRUCTION

COLUMNS

COLUMNS

DEPARTMENTS

Model Airplane News (ISSN 0026-7295) is published monthly by **Air Age, Inc.**, 632 Danbury Rd., Wilton, CT 06897. Second class postage paid at Wilton, Connecticut, and at additional mailing offices. Subscription rates are $25 for 1 year (foreign $33), $47 for 2 years (foreign $63), $65 for 3 years (foreign $89). **Postmaster:** Send Form 3579 to **Model Airplane News**, P.O. Box 428, Mount Morris, IL 61054.

MODEL AIRPLANE NEWS
The world's premier R/C modeling magazine

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SUBSCRIPTION PRICES:
U.S. & Possessions (including APO & FPO): 1 year $25.00; 2 years $47.00; 3 years $65.00. Outside U.S.: 1 year $33.00; 2 years $63.00; 3 years $89.00. Payment must be in U.S. funds.

MODEL AIRPLANE NEWS is published monthly by Air Age, Inc., 632 Danbury Rd., Wilton, CT 06897. Connecticut Editorial and Business Offices, 632 Danbury Rd., Wilton, CT 06897, phone 203-834-2900. Y.P. Johnson, President; G.E. DeFrancesco, Vice President; L.V. DeFrancesco, Secretary; Y.M. Micik, Treasurer. Second Class Postage paid at Wilton, Connecticut, and additional Mailing Office. ISSN No. 0026-7295.

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ADVERTISING: Advertising rates available on request. Please send advertising materials, insertion orders, etc., to Advertising Dept., Air Age, Inc., 632 Danbury Rd., Wilton, CT 06897, phone 203-834-2900.

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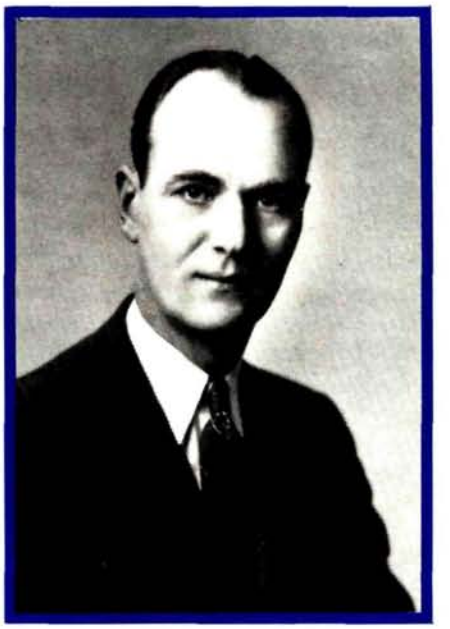
Editorial

by DAN SANTICH

WHAT ARE you famous for? That was the question my flight leader asked my first day in Boot Camp upon joining the Air Force. Standing at attention and scared as hell, his intrusive looks and military staunchness had me quivering in my boots. As he moved down the line of fresh recruits, he asked each one the same question. I wondered what I would say when he got to me. My mind was a blank. Hell, I wasn't famous for anything, unless that included my stupidity for letting myself get into this situation in the first place.



Joseph S. Ott, 1900-1986

To my surprise, every one of the guys had an answer that satisfied this giant with more stripes on his arm than a zebra. Finally he got to me. "What are you famous for, Airman?" he yelled sternly, looking me right in the eye. "Sir. I am famous for my airplanes. Sir." Mind you, I had built a total of about six airplanes by that time and crashed them all, but it was the only thing I could think of to say. He seemed satisfied because he went on to the next recruit.

It is said there are some individuals you remember for your entire life and one of them is your drill instructor. That's certainly true. What my DI was doing was establishing self identity among us recruits. He knew that every individual had something special inside, it just took some coaxing to get it out. Once exposed, he would help that person build upon it.

Little did I know at the time that I would one day be the editor of a magazine with worldwide distribution, or that I would design models for thousands to enjoy. What the drill instructor did was to plant the seed of thought provocation. He made us think for ourselves. In a war a soldier must follow orders, but he must also have the creativity to set his own stage. All wars are won by little battles that accumulate and gather momentum to the final victory.

So what does this have to do with modeling? The message is to think for yourself, to be creative, and to be famous for something. Your efforts toward creativity, no matter how insignificant they might seem, benefit all of us in the long run.

And so I ask, what are you famous for?

THE NAME Joe Ott, although not a famous household name, will be remembered by modelers as the "Father of Model Aviation in America." Joe passed away on June 25, 1986, at the age of 86. A member of the National Free Flight Society Hall of Fame and the AMA Hall of Fame, Joe was at one time the most widely known designer and largest manufacturer of model airplanes in this country. Joe Ott was a resident of Niles, Illinois, an Army Air Corps pilot, a design engineer for industry, a model designer and manufacturer, and a good friend to all who knew him. If

(Continued on page 130)

Airwaves

Status of Kraft Radio Repairs

Kraft Systems has now ended all association with Radio Control Systems, and the companies who purchased the inventory have also divorced themselves from this product. With the extremely large number of excellent units still in everyday use, Kraft Midwest has managed to ensure the serviceability of these units.

We are confident in being able to supply parts and service for many years, and have purchased new test equipment to meet the stringent requirements for converting units to the new channels. We are able to provide a discount to bona fide retailers, this amount varies according to the labor involved.

PETER T. WATERS, PRESIDENT
Kraft Midwest
117 E. Main St., Upper Level
Northville, MI 48167
313-348-0085

He Likes "How To's"

I am writing to you to tell you why I am renewing my subscription to *Model Airplane News.* There was an article by Dan Santich in the September 1986 issue of your magazine and I have been seeking such an article for a long time—it was excellent. The article was about a basic control system in a radio-controlled airplane. More "how to" articles like this badly need to be written and published.

ARTHUR M. CASH
Chamblee, Georgia

Editorial Comment

Your editorial in the September 1986 *Model Airplane News* leaves mixed emotions and probably is provoking confusion. On one hand, you warn us of an unscrupulous manufacturer in this hobby. On the other, you don't tell us who! I now feel anxiety and suspicion about *all* of them, and hesitate to do business (as I'm "alerted"—but in the dark!).

M.B. SCOTT
Shawano, Wisconsin

The editorial served its intended purpose in that the makers and distributors of our hobby products need to be on their toes, and that means all of them, about misleading or false advertising, bait-and-switch tactics, or any such nonsense. This hobby does not need these people and I will do everything possible, within reason, to help the modeler. DBS

Where's "Golden Age"?

Just a short note to tell you I missed the "Golden Age of R/C" column in the August 1986 issue of *Model Airplane News.* I think your magazine is the top modeling publication and columns like "Golden Age" separate you from the others. I think a truly great magazine needs real experts in each edition. Maintain this policy and you will always be on top.

THOMAS McCOY
Sterling Heights, Michigan

Thomas, as I've mentioned before, we would love to run all our regular columns in every issue, but space does not permit it. If a particular column is missing one month, look for it the following month. DBS

Flying Fields and Noise

I read with much interest your editorial on noise in the August issue of *Model Airplane News* and you are to be applauded for your efforts.

I personally have come to the conclusion, however, that those of us who are involved in this hobby need to either educate ourselves in the more technical aspects of sound and noise, or we need to hire acoustical consultants to help us out.

The National Institute for Occupational Safety and Health (NIOSH) can tell us that in the workplace safety precautions need to be taken when sound exceeds X decibels. But we are not dealing with that in our hobby. Instead, we are dealing with the problem of sounds at frequencies which many people find very annoying and objectionable.

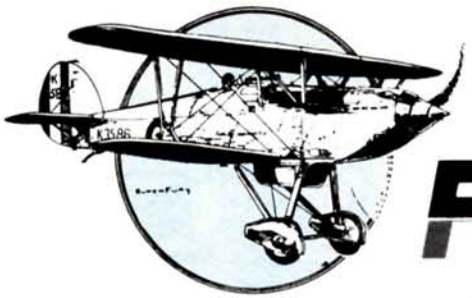
You said we need to reduce the noise output of our motors to 50 db, yet ambient noises produced by cars and wind outdoors or heating and ventilation systems indoors produce sound levels which exceed 50 db.

Because modelers apparently will not voluntarily take remedial action, maybe the AMA should make it mandatory that if a flying site is within x distance from a residential area, a manufacturer's expansion chamber or muffler which effectively reduces noise to x db is required for the 1987 flying season. Since many sites are donated, leased, etc., as the result of the AMA insurance more clubs will both comply and bring more pressure to bear on manufacturers for more effective mufflers.

It may also be true that some modelers are expecting the neighboring residents to put up with too much. There are probably many sites in use today where diesel or four-cycle motors would be more appropriate.

GARY L. MEYERS
Overland, Missouri

*We welcome your comments, opinions, and suggestions. Letters should be addressed to "Airwaves," **Model Airplane News,** 632 Danbury Rd., Wilton, CT 06897. Letters may be edited for clarity and length.*



Fifty Years Ago...

by DAN SANTICH

NOVEMBER 1936 was an optimistic period for aviation growth around the world, and the most outstanding factor was the rearmament of the Great Powers. Germany actually began the buildup of its air force four years previously when Adolf Hitler and Hermann Goring came to power. The Russian, French, Italian, British, and American air arms were faced with several problems, one of which was the lack of a high-performance fighter, the primary quantity still being biplanes. Hawker Aircraft of Kingston-on-Thames, England, had several monoplane fighters in development and testing, one of which was the Hurricane, although no performance figures were available.

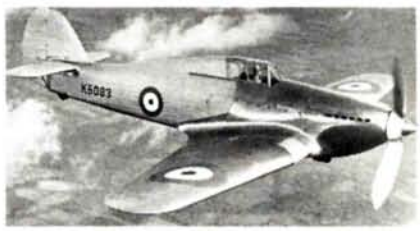
Due to the popularity of gas motors, which were becoming more and more prevalent, modeling was undergoing great changes. Frank Tlush authored an article on how you could increase the performance of gas engines, as well as a checklist on troubleshooting. As all motors of that time were spark ignition, the electronics were given primary consideration. Motors available to the modeler were the Baby Cyclone, the Brown Jr., the G.H.Q., the Bunch, the Forster, the Gwin, and the Fergusson, the latter also offered as a four-cylinder. Cleveland Model and Supply offered an engine called the Tom Thumb, however, it had a striking resemblance to the Bunch Mighty Midget.

The Baby Cyclone engine was very popular, selling for $15.75.

Full-scale Lockheed 12A was built for commercial use and could carry 6 passengers. Photo courtesy of "Jane's All the World's Aircraft, 1936."

The Vought XSBU-1 with a 700-hp Wasp engine was the last of a breed.

Kits for gas motors were very popular, with Burd, Scientific, Modelcraft, and National Model Company all producing them. International Model Company of New York offered a gas kit of the Rearwin Speedster that had a span of 64 inches and was designed by the famous modeler Joe Ott. It sold for $5.



Top: Bucker Jungmann, a two-seat trainer used by Germany during the period. Bottom: Britain's Hurricane single-seat fighter was introduced in 1936 without armament or performance information. Photo courtesy of "Jane's All the World's Aircraft 1936."

International Model Company of New York introduced the Rearwin Speedster, a model designed by Joe Ott.

Stick, tissue, and perseverence were the order of the day for modelers in November 1936 and *Model Airplane News* was there. ■

TRANSMITTERS

Basics of Radio Control

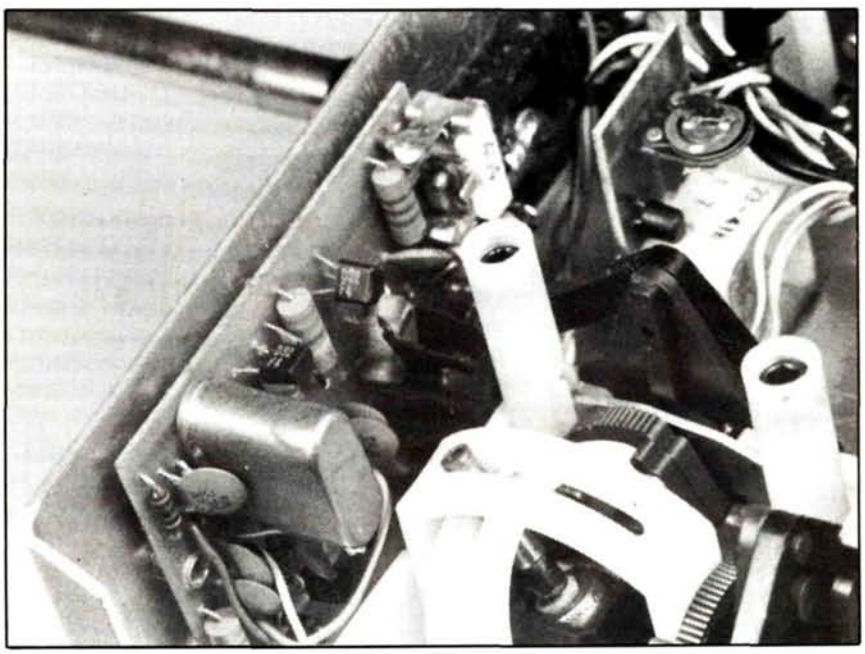
by RANDY RANDOLPH

SO FAR IN this series I've discussed servos and receivers. Now it's time to talk about the part of the system that places the pilot in the airplane, the transmitter. A few words about radios, their history, and how transmitters work might be in order. Radio was discovered accidentally and most improvements came about the same way, so it can't be too difficult to understand!

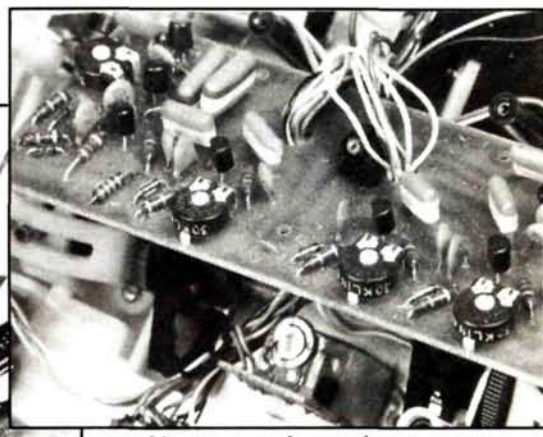
A long time ago it was noted that when the frequency of alternating current (AC) was increased, a point was reached when some of it left the wire and was radiated into the air. Thus radio was discovered. In radio, the term "frequency" means the number of times that a flow of current changes direction, or alternates, in one second. In our country AC house current changes direction 60 times a second and is called 60-cycle.

Radio frequencies begin just above the frequency we are able to hear: about 15,000 cycles per second or 15 kilohertz (KHz). When referring to radio, "kilo" means "thousands" and "hertz" means "cycles per second." Along the same line, "mega" means "million," so "megahertz" (MHz) stands for millions of cycles per second. The standard AM broadcast band extends from 550 KHz (thousands) to 1,600 KHz, or 1.6 MHz (millions).

In the beginning, radio was generated by a spinning saw-toothed wheel that brushed by a wiper. By connecting the wheel to one terminal of a battery and the wiper to the other, every tooth/wiper contact caused a spark! The speed of



RF board shown can usually be located by the presence of the crystal, shown here just to the left of the stick yoke.



Ace kits are complete and easy to assemble. Completed encoder board, above, incorporates travel control adjustments.

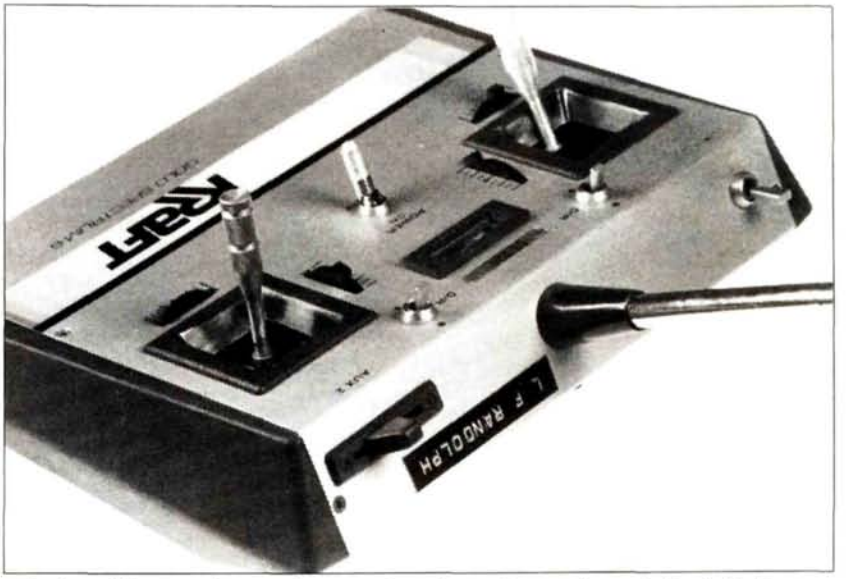
rotation determined the frequency of the spark that jumped between the contacts. These spark transmitters were quite noisy; the spark generated radio waves all up and down the radio frequency spectrum. They were quite inefficient, yet transmitters like that and simple diode receivers passed messages across oceans! The invention of the vacuum tube quickly spelled their doom.

The vacuum tube not only made the reception of radio signals better by offering a method of amplifying them, it also made it possible to generate radio waves with a circuit called an "oscillator." This circuit fed some of the amplified signal back into the tube, generating a sustained oscillation (like a dog chasing his tail), which was maintained as long as a voltage was applied to the tube. It was then possible to generate "clean" frequencies into the MHz range and higher.

Fifteen-year-old transmitter that is still clean and right on frequency. Regular maintenance and care will allow long equipment life.

The transistor, which we all have grown to love, replaced the vacuum tube in almost all low and medium power applications. It can produce the same results with less power input than vacuum tubes, and it can do it in a much smaller space. But transistors, and their close relative the integrated circuit, work about the same way as vacuum tubes. So, our transmitters use the same basic circuits that were used 60 and more years ago!

Frequency, then as now, is determined by a mechanical device called a crystal.



The last of the American-made transmitters by Kraft. Metal cases helped eliminate body-generated electronic signals.

When a small electric current is passed through a quartz crystal, it will vibrate at a rate dependent on its size and thickness. Thus crystals can be used to set the frequency of an oscillator by grinding them to a specific size. Crystals are used to control the frequency of our transmitters, as well as our receivers, to keep them stable.

Crystals are not a cure-all for frequency stability, because they are affected by heat and cold and can change accordingly. Compensating circuits can be designed to help in this respect and are usually included in our transmitters and receivers, but they can only help, not eliminate. Don't leave your transmitter in the sun!

Once the radio frequency is generated by the oscillator, some intelligence must be put on the signal for it to be of any use. In the beginning it was enough to turn the transmitter on and off to send messages and later to control the rudder in our R/C airplanes, but now it's necessary to send much more information to the receiver than just "yes" or "no." A process called modulation is used to put information on the radio signal. The movements of the sticks and trims are translated into pulses by an encoder, then superimposed on the radio frequency signal by the modulator.

This modulation is done in two different ways in our transmitters. Either the frequency is changed slightly (FM) or the strength or amplitude (AM) of the signal. FM is a little less expensive to generate, because it can be introduced into lower levels of the transmitter. AM requires more modulating power, because it's introduced into later or output stages. In practice, given the same bandwidth, the AM signal is somewhat the better of the two. Sometime in the future when a computer-generated-and-detected type of transmission (packet radio) is developed for R/C, the type of modulation will be of no importance.

Our transmitters are made to be used. The more they're used, the better and smoother the sticks give their messages to the encoder and on to the receiver. Don't throw them around. Keep them clean and charged, and don't leave them out in the sun, dust, or rain, and they will give you years of service.

Randy Randolph, c/o *Model Airplane News*, 632 Danbury Rd., Wilton, CT 06897. ■

another model, but I'll tell you about that later on.

Over and above everything else, the weight of this model is of primary importance. I'm sure it would fly at a weight of 40 pounds, but for maximum versatility and enjoyment I'd try to keep it at less than 15 pounds. At that weight you can do things you never believed possible. So far I've used a Bully, a Sachs, an Eagle Twin, a Horner Twin, a Quadra, and a Saito Twin for power, and they all do a good job. Probably the best setup was with the Sachs 3.7 from T&G. I say "was" because I planted the thing in anticipation of the coming airplane harvest. Actually I shot myself down when I got the wrong frequency clip at a recent fly-in. Dumb move, Dan.

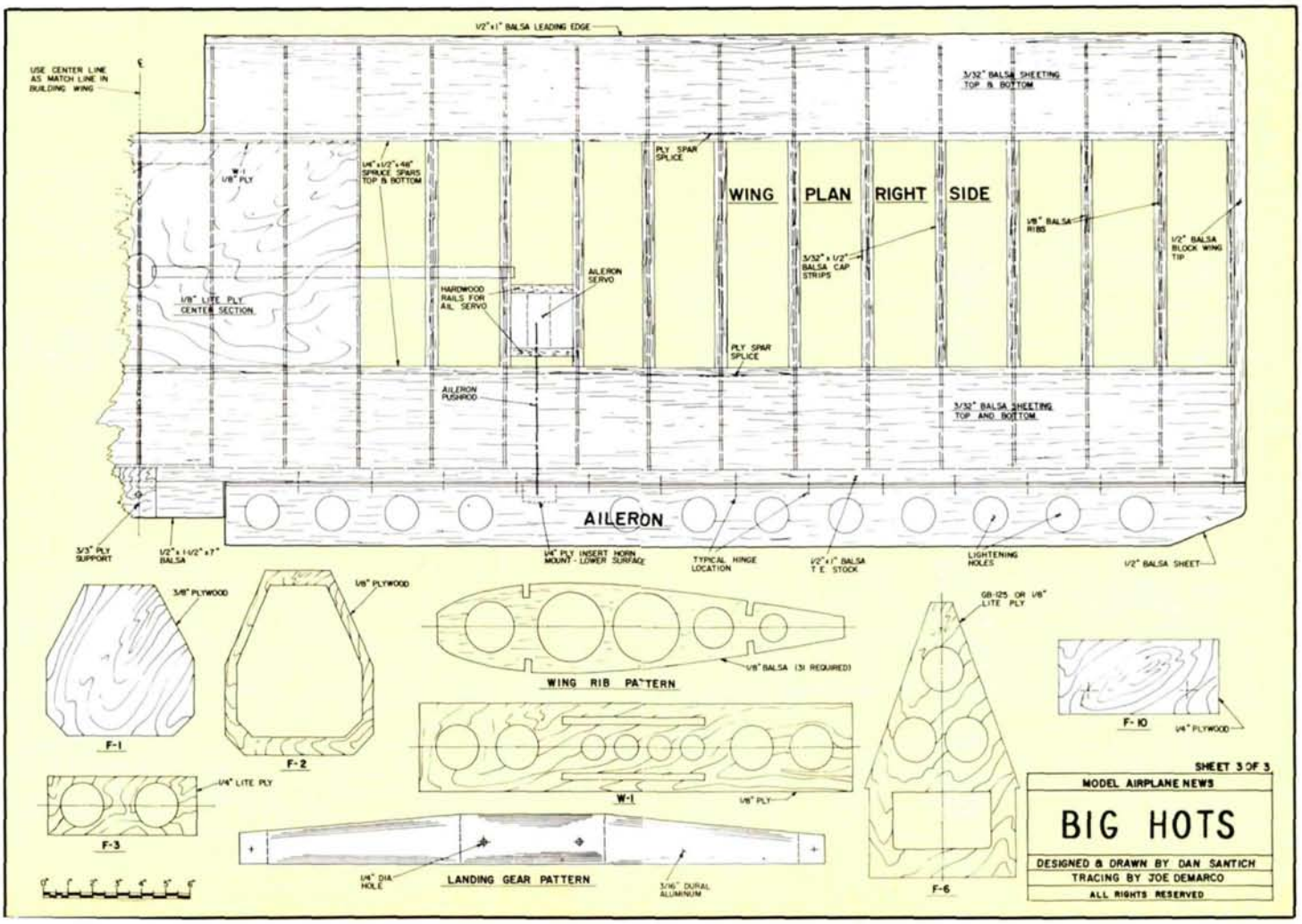
The Hots design has proven to be popular due to the simplicity of construction and excellent flight characteristics.

photos by ALAN PALERMO

Up until that time, however, I had at least 50 flights on the bird. Believe me, it was a sheer joy to fly. It's one of those rare airplanes that flies on the wing rather than on the horsepower. In fact, I hardly ever had the throttle above the half power setting, and usually below that. Sure it was overpowered, but for sheer excitement there is nothing like the climb of an Atlas missile! Throttled back you can walk alongside the thing on a fly-by. Give it a little power and it will loop inside a 50-foot circle. But keep in mind that you can only do these things if the wing loading is feather light.

Achieving a light but strong airframe takes a

FULL-SIZE PLANS AVAILABLE...PAGES 124, 125

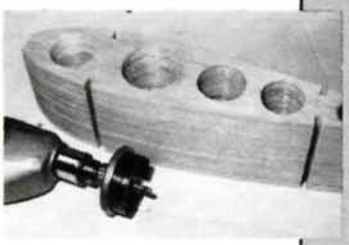


Kathy Whitehead of the M.A.N. staff demonstrates the size of the 91-inch span Big Hots.

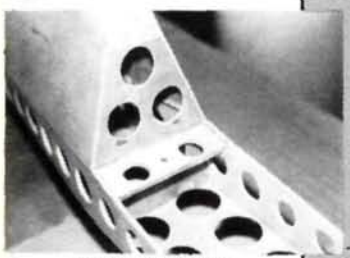
bit of work. First you must be selective in your use of material, then you have to make holes where prudent. For this I used a circle cutter that attaches to a hand drill. You can get one of these at most any hardware store. Believe me, it does make a difference in weight. Bob Violett Models* carbon fiber material would also help in the weight-saving department. You could use Magnalite for most plywood parts, except for the front bulkhead. The landing gear I used is similar in size to the Midwest Big Stik. In fact, it would be best since it gives more prop/ground clearance than the one shown. This might be necessary if you fly out of a rough field.

CONSTRUCTION. All of the wood in this model was Midwest Products* Contest Grade. Select the lightest sheets you can find, but stay away from pulpy wood, which you can generally tell by the grain pattern. Spruce and light-ply parts are necessary in the areas that need strength. If you depart from that, you're on your own. I do know that mine stayed together throughout the rigors of flight.

For building my models I use a solid door that is set on a frame. This gives me plenty of area and it's flat. The importance of keeping everything straight cannot be overemphasized. I draw a line the length of the building board and reference

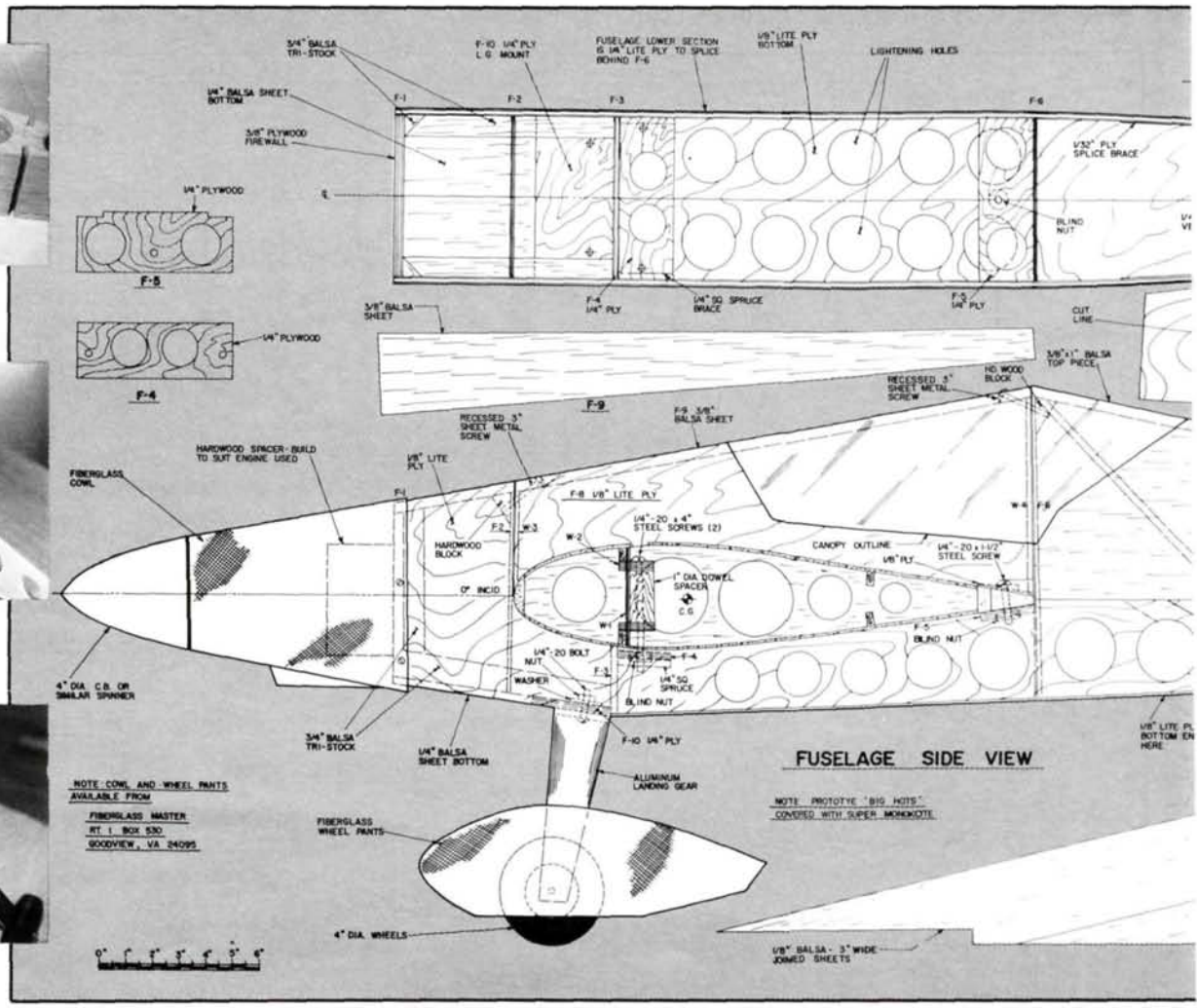


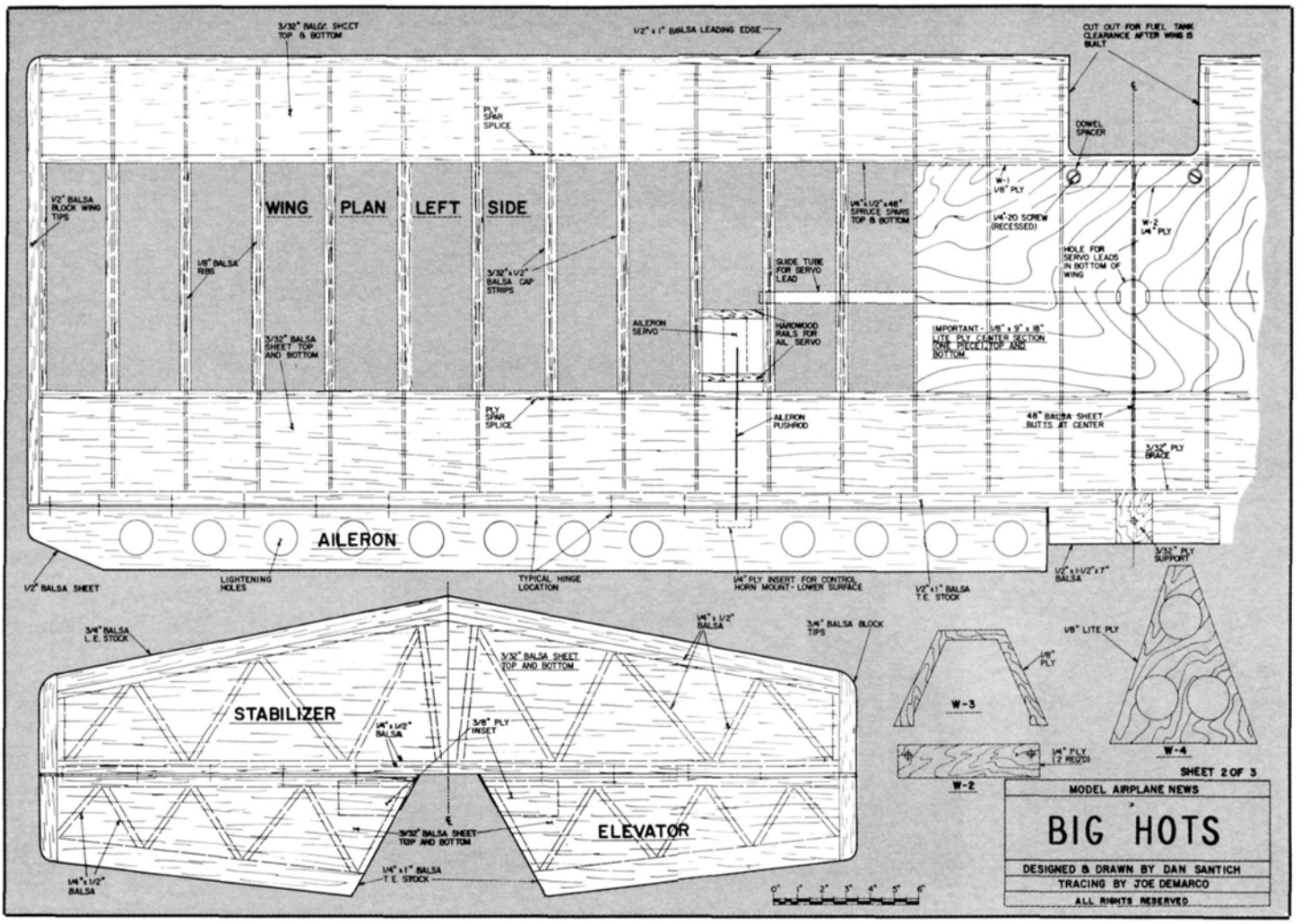
A keyhole drill was used to make lightening holes.

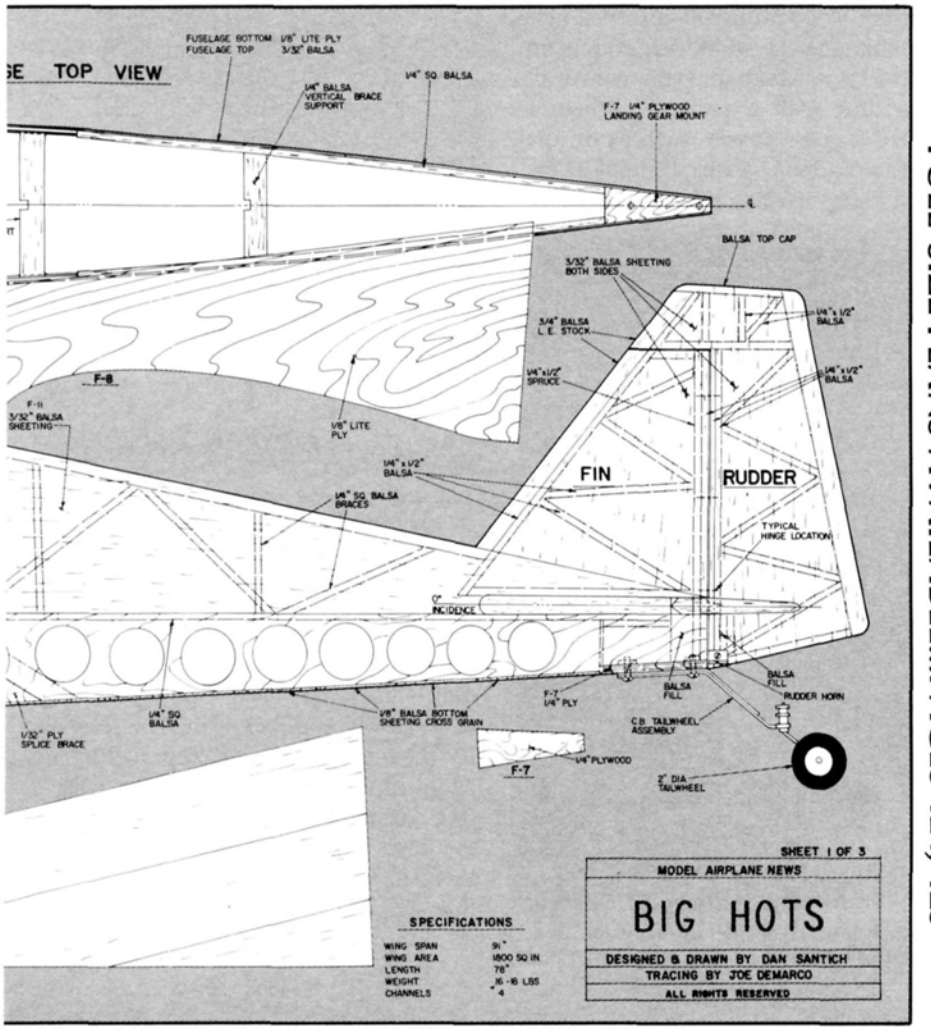


Lightening holes should be spaced for adequate airframe strength.

Even the landing gear should not escape the drill.







FULL-SIZE PLANS AVAILABLE...PAGES 124, 125

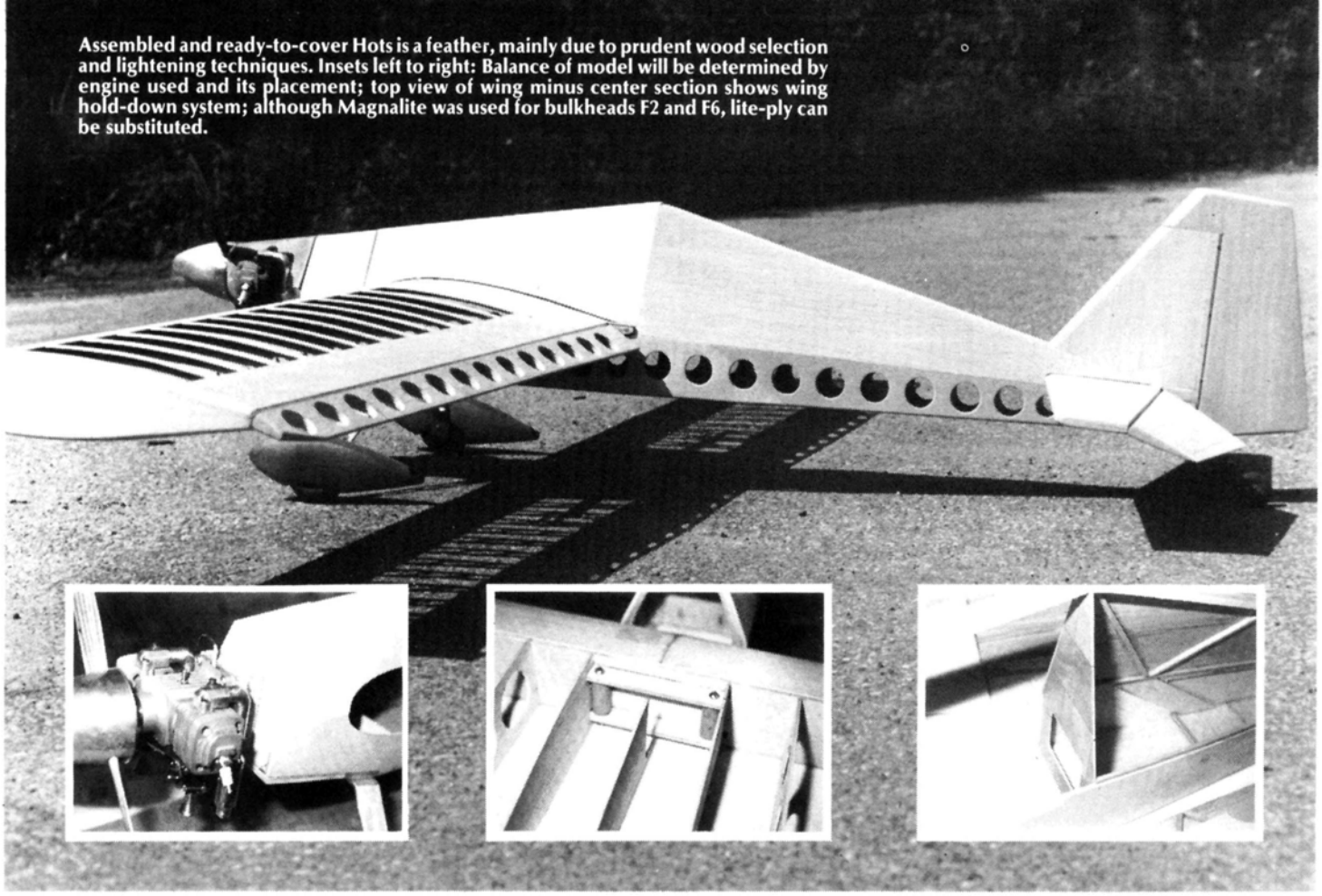
everything from that.

Start by cutting the sides and laminating the balsa section to the rear. With two equal sides, glue the bulkheads in place and add the bottom pieces. This will give you sufficient alignment so that adding the top portion will not bow things out of shape. When building your stabilizer parts, again make sure you build them light. You'll notice in one of the photographs that I used ¼-20 steel bolts to hold the stab in place. You might or might not want to do this. It did add weight to the critical tail moment, but I never had to worry about the stab coming off. It's up to you. It did make it easy to transport the model.

The wing is a barn door! It has a very thick airfoil section (18%) and gobs of lift. You'd think that with such a huge wing the airplane would be a dog. Well, don't let it fool you because this thing is no pooch. It really moves out when you want it to, but it takes power to overcome the drag. It also flies superbly at low power settings. You figure it out! I've flown it backward with a litte breeze.

The wing is built flat with no

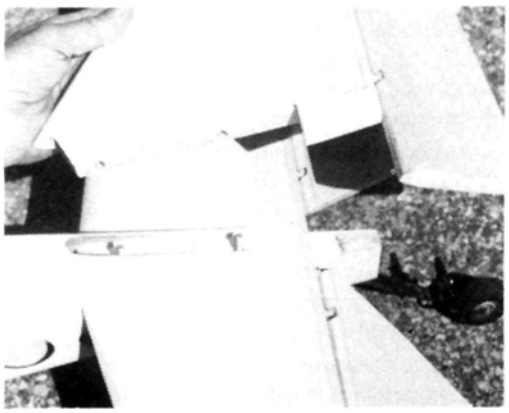
Assembled and ready-to-cover Hots is a feather, mainly due to prudent wood selection and lightening techniques. Insets left to right: Balance of model will be determined by engine used and its placement; top view of wing minus center section shows wing hold-down system; although Magnalite was used for bulkheads F2 and F6, lite-ply can be substituted.



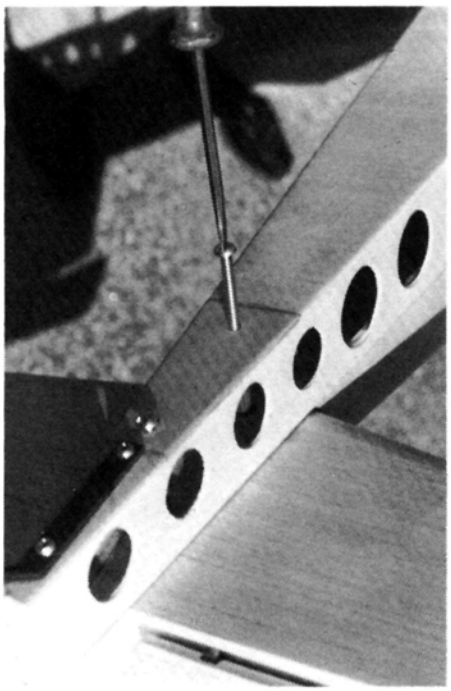
dihedral. I thought that since it is so big it would look droopy like some flat wings tend to. But this one doesn't, most likely because the wing is center-mounted. And speaking of mounting the wing, the method I used works great. The center section between F-2 and F-6 is a separate piece and mounts onto the wing after it's bolted in place. (Aren't you glad I didn't make this a one-piece airplane!) By the way, your smoke tank will fit inside the top section.

For covering the model I used Top Flite* Super MonoKote. It gives plenty of torsional rigidity and is lighter than a painted finish. For a nice covering job I sand the wood with 200-grit open-face paper and then go to 400-grit, ending up with 600-grit. Make sure you remove all balsa dust with a vacuum. Where I wanted a color splash, such as on the wing across an open area, I cut the pieces individually, overlap them ¼ inch, and secure them with scotch tape on the adhesive side. I then turn the material over and put the seam on a raised strip of ½-inch balsa and tack them together at 6-inch intervals. Then I go down the seam slowly and lock it in. The reason for the scotch tape is to keep the Super MonoKote from sticking to the balsa strip. After the seam is made you can pull the tape off. Now you can put the laminated pieces on your wing like it was one big piece. Just be careful not to put

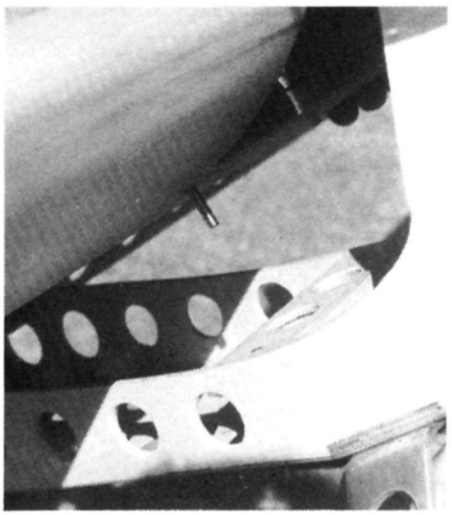
(Continued on page 90)



Not shown on the plans, this alternate method for stab mounting was convenient for model transportation. Modification is builder's choice.



Six-inch long ¼-20 steel screws were used for detachable stab.



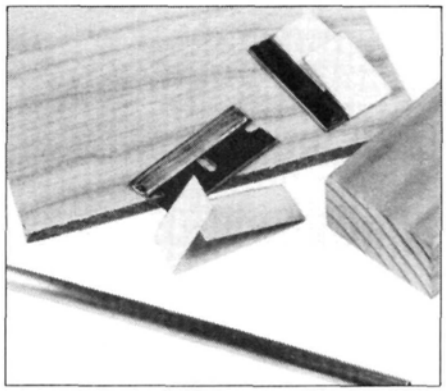
Forward ¼-20 steel wing screws attach to mounting plate F4.

How To:

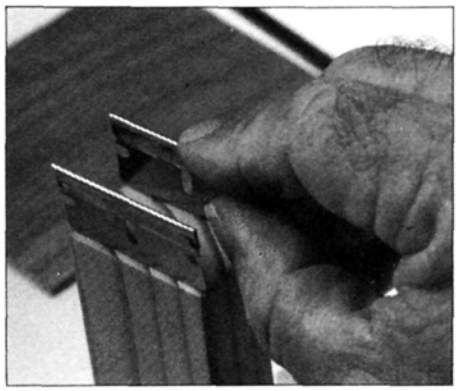
by RANDY RANDOLPH

MAKE A PROP BALANCER

Although the quality of today's propellers is excellent, variations in the wood from which they're machined can cause one blade to be slightly heavier than the other. A sensitive prop balancer will quickly discover this possible imbalance. The photos show the way.

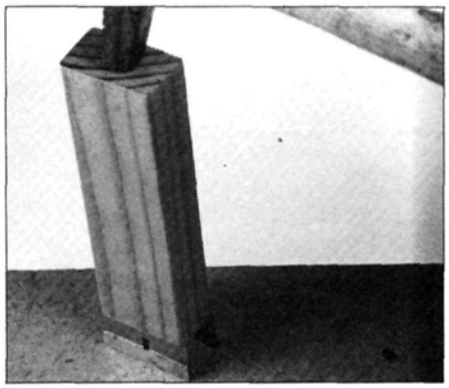


1.



2.

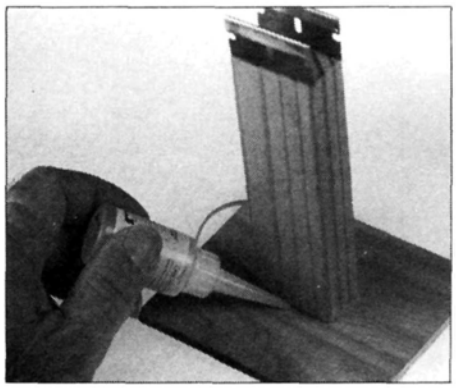
1. The required materials are two single-edge razor blades, a 6-inch length of brass tubing (see No. 5), a 6-inch length of 1x2-inch hardwood, and a 6x6-inch piece of ⅛-inch plywood. The only necessary tool is a hammer.



3.

2. Position the two single-edge razor blades close to and parallel with the widest sides on one end of the hardwood. Rock them back and forth to work them into the wood.

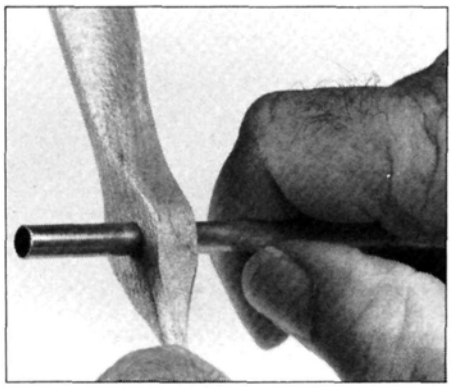
3. Turn the block upside down on the workbench and tap it with a hammer to drive the blades into the wood. Be sure that the block is at right angles to the bench so the backs of the blades are exactly even with each other.



4.

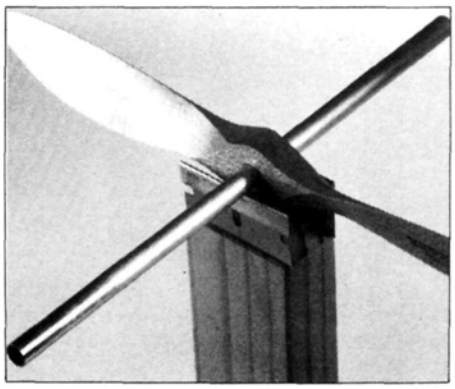
4. Glue the block to the square of plywood. Instant glue or one of the white or aliphatic resins will be fine. The top edges (backs) of the razor blades should be parallel to the plywood and even with each other.

5. Brass tubing is available to fit most prop shafts; in this case, the propeller was drilled with a ¼-inch hole so ¼-inch tube was used. A good fit is necessary. Slide the prop to the middle of the tube.



5.

6. Place the prop on the balancer. The tube should be at right angles to the razor blades. The heavier blade will roll down. Sand the underside of the heavy blade until balance is achieved.

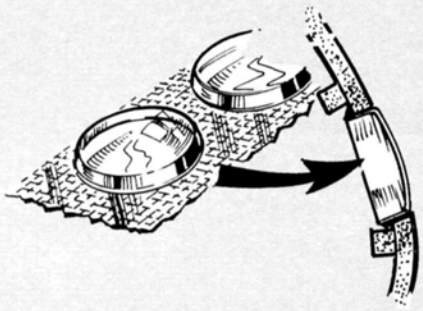


6.

Hints & Kinks

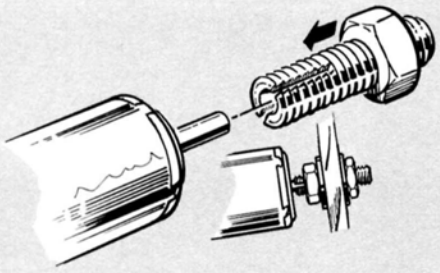
by JIM NEWMAN

Model Airplane News will give a free one-year subscription (or one-year renewal if you already subscribe) for each idea used in "Hints & Kinks." Send rough sketch to Jim Newman, c/o **Model Airplane News**, 632 Danbury Rd., Wilton, CT 06897. BE SURE YOUR NAME AND ADDRESS ARE CLEARLY PRINTED ON EACH SKETCH, PHOTO, AND NOTE YOU SUBMIT. Because of the number of ideas we receive, we cannot acknowledge each one, nor can we return unused material.



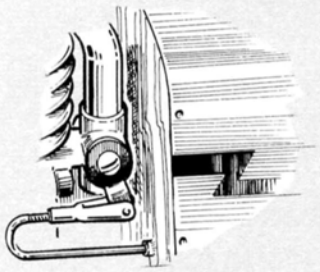
The new scale model called for a few molded "port holes" and this man found what he needed in the packaging of throat lozenges. Slightly tapered, the moldings pushed neatly through the sheeting from the inside.

Danny Thomas, Portage, Indiana



Need a propeller adapter for an electric motor? Drill out a headless bolt for part of its length. Hole diameter should be 1½ to 2 thousandths inch smaller than diameter of motor shaft. Saw slit as shown, then push adapter over shaft, which will cause it to spread slightly, but running the nut down it will cause it to grip the shaft. Additional nut and washers will hold propeller or boat universal joint.

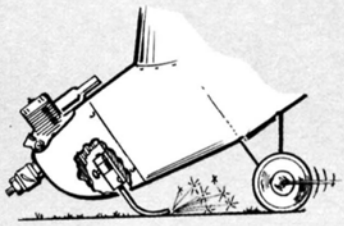
Zilka Yoram, Holon, Israel



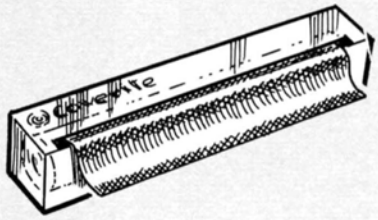
Rear-mounted carburetors, especially on four-cycle engines, often pose a clearance problem between the throttle clevis and the firewall. Put a 180-degree bend in the throttle rod as shown—this cures the problem by putting the clevis forward of the throttle arm. *Andre Bruens, Ede, Holland.*

How many times have you searched around for a small funnel when there are dozens of them in your house? Almost any household plastic container, when cut to suit, will yield a funnel. Hole in edge provides means to hang up, although your columnist prefers to store his in a plastic bag against contamination by dirt.

George Neil, Huntington Station, New York



Three-point landings—on cowl and main wheels—are hard on the paint! Bolt a regular nose gear bearing to the firewall, then attach a bent wire skid as shown. Often used by the early 1900s pioneer airmen! *Ron Carter, Springville, Utah.*



This is a neat method of dispensing your Coverite—or any other off-the-roll covering material. Except for ½ inch or so at each end, cut back the lid of the box to provide a slit through which the material is fed.

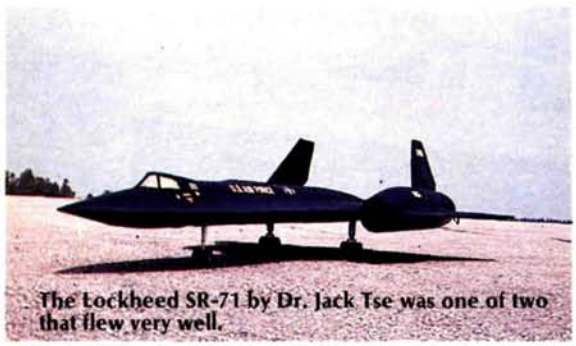
Michael Freeston, Pine Bush, New York.

Bobby Fiorenza's new hot rod, a Dynamax-powered Jet Hangar Hobbies A-4 Skyhawk.

'86 Canadian Jet Rally

Jet action from way up north!

by RICH URAVITCH



The Lockheed SR-71 by Dr. Jack Tse was one of two that flew very well.

Bob Violett's Sport Shark with revised vertical fin option was very fast.

Jack Tse's McDonnel-Douglas F/A-18 Hornet in #7 aircraft finish.

photos by RICH URAVITCH

HEY, HOSERS, TOOK a trip to the great White North earlier this year, eh. Word was that a group of Canadian modelers, the Bay of Quinte Aeromodellers specifically, were going to hold a fan jet rally. Immediately recognizing the international implications of this event, I made plans to attend.

The program was spread over two days and was well organized by CD Joe LeBoutier, assisted by other club members. The site was Mountain View Airport, a Canadian Forces training base which provided 5,000x150-foot paved runways. The club has developed an outstanding relationship with the Commanding Officer who permits the use of the site for their flying activities and, in fact, closed the facility to all full-scale traffic for contest weekend! Try *that* one locally!

The weather during the weekend was less than accommodating and provided a ghastly mix of sun, high wind, rain, overcast skies, and thunderstorms. Not to worry, tornado warnings are what prematurely concluded Sunday's activities. Did this intimidate or, even worse, *ground* the intrepid participants? Nah. Thirty fliers brought 46 airplanes and most of them flew during the meet.

A walk through the pit area revealed that our Canadian fan friends put their rugged winters to some real productive use. There seemed to be a pretty equal mix of kit- to scratch-built machines.

Some of you regular "Jet Blast" readers might recall the F-18 and Me-262 I ran pictures of some time ago. Well, they were there in pairs, along with two SR-71s, a YF-17 Cobra (predecessor to the F-18), an F-106—and that group was owned by one guy, Dr. Jack Tse* of Ontario. Jack has assembled a consortium of five modelers, each with a specialty, each contributing to a project in addition to doing his own thing. Jack handles the design and development chores, Gary Strong and Fred Steenson do the glasswork magic, Winston Curtis cuts foam cores and adds sheeting, and Don Kinch paints and flies up a storm. This approach really does get the job done, as witnessed by the number of their airplanes on hand.

There was a lot of representation from the manufacturers. Tom Cook of Jet Model Products* flew his well-known F-4D in formation

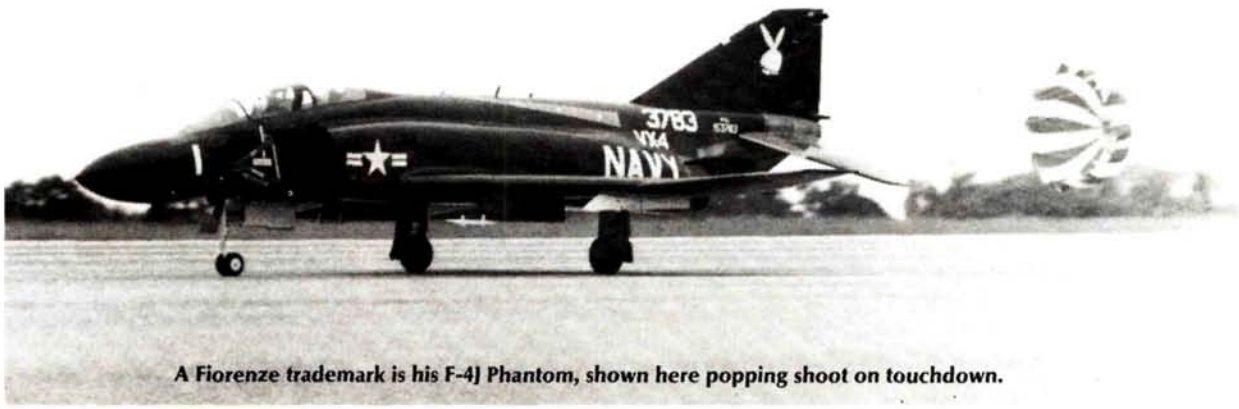
Jack Tse also built this Me-262 from the Air Flair kit, flown here by Don Kinch.

Kerry Sterner's ½-size BD-5J flew extremely well.

with Bob Fiorenze's F-4J. They really looked great. Tom spent a lot of time with other participants, especially those who brought Starfires built from his kit. In fact, he even test-hopped a couple of them. That kind of "factory" support is hard to beat.

Bob Violett* brought three of his outstanding products, beauties all: two Sport Sharks and his daughter Patti. Bob has now offered an optional fin configuration for the Shark; it's got a little cleaner base shape than the original. A surprise appearance by Ivan Kristensen, AMA Pattern Champ, livened things up when he latched onto one of the Sport Sharks, did one "get comfortable" flight and proceeded to entertain all of us. Bob has incorporated a "hot plug" circuit which really permits both ends of the speed envelope to be touched. The flat-out speed is blistering and the low end appears to be very docile. It's the first ducted-fan model I've seen where "throttle management" appears to be required. It builds up so much "go" on the down side of a split-S, you're probably best advised to back off on the power.

Performance efficiency of a different type was



A Fiorenze trademark is his F-4J Phantom, shown here popping shoot on touchdown.

Another airplane by Jack Tse was this fine Knights of the Air F-106.

Tom Cook, kneeling, lends a hand with Mike Krizan's newly-finished Starfire from Tom's kit.

exhibited by Kerry Sterner* with his ½-scale BD-5J carved from foam and glass covered. Powered by a Byrojet/Rossi .81 combination, this 17-pound machine cruised around more majestically than spritely, and flew smoothly despite high winds. Landing was literally at walk speed. Kerry built this one as an experiment, and it probably represents the largest model aircraft yet flown by a single fan unit. Certainly *not* in the experimental category was Kerry's tried-and true F-80 Shooting Star. I've said it before, it's a great flying airplane! A Dynamax-powered version is available.

Above left: Bob Violett and daughter Patti with pattern champ Ivan Kristensen on left, who appeared to really enjoy the Sport Shark. Above right: Mark Frankel with his tried-and-true Gloster Javelin, now departed.

Bob Parkinson* was represented by a gaggle of his CF-105 Canadair Arrows. This looks like it makes a great sport-scale fan model. The delta planform really slows down the approach.

(Continued on page 119)

Gerry Dale's F-86 in Golden Hawk markings. The full-scale example was on display a few miles from the site.

Jack Tse, left, ministering to one of his fleet, in this case an F-106.

Kerry Sterner's ½-scale BD-5J was a very interesting design and flew extremely well.

Easy assembly and space age materials make it an appealing machine.

Kalt CYCLONE

From Circus Hobbies

by CRAIG HATH

WITH the growth of interest in radio-controlled model helicopter flying, many helicopter kit manufacturers are designing and kitting models that are aimed at the beginner and sport flier. These designers are trying to achieve a model that's easy to assemble (4 to 10 hours is considered easy), simple to repair, inexpensive, and having stable flight characteristics. Well, Kalt Model Products of Japan has attained these goals with the Cyclone, one of the new breed of model helicopters, and it's distributed in the U.S. by Circus Hobbies*. If you're considering getting started in R/C helicopters, or if you're a serious sport flier, check out the Cyclone.

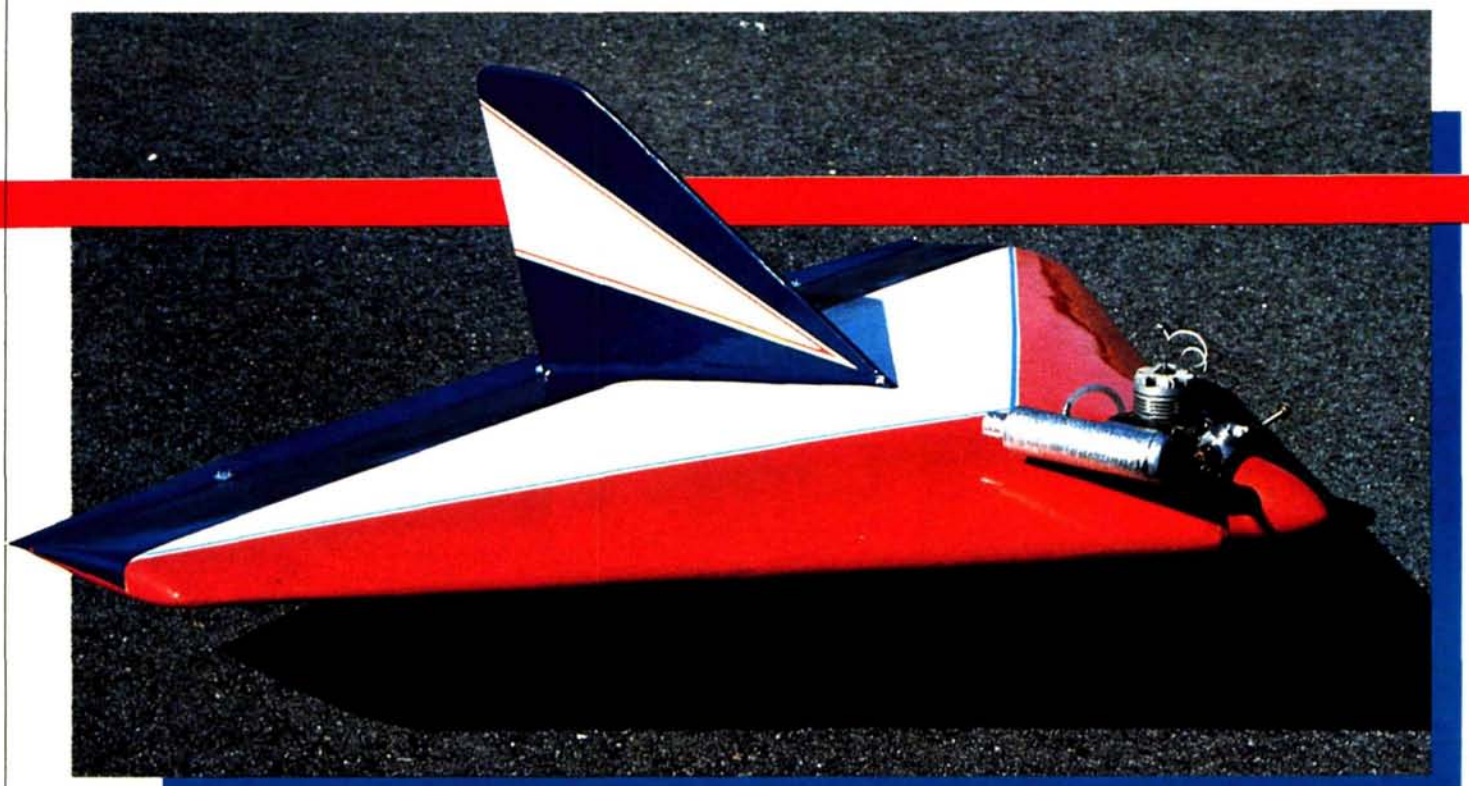
The new Cyclone is Kalt's latest addition to a family of model helicopter kits. It's unique to the radio-controlled model helicopter market because it represents the first of what is sure to become the norm in model helicopter kit construction. The Cyclone is manufactured from nearly all composite materials, such as glass-filled nylon, fiberglass, and molded ABS plastic. These materials provide the builder with simple assembly and easy repairs at reasonable costs. If you consider the easy assembly and repair of the Cyclone, and then couple that with outstanding flight performance, you'll agree that this is a perfect choice for the beginner and sport flier.

THE KIT. The Cyclone comes in ready-to-assemble kit form, and includes most everything required for completion. The only additional components required are a 5 or more channel radio control system (preferably a system designed for use with helicopters), a .45 to .52 two-cycle model engine and muffler (preferably with helicopter heat-sink cylinder head), and about 12 inches of medium silicon fuel tubing.

The helicopter itself features a unique construction technique, which employs a mainframe system made of glass-filled nylon molded in two halves that accept all of the interior components. When the halves are joined, the assembly becomes a very rigid monocoque unit. The tail rotor is driven by a rubberized smooth belt and simple pulley arrangement, which eliminates many vibration-prone parts. The belt is part of a new technology which can be found in automotive and advanced mechanical applications. Kalt's use of this belt shows the forward thinking of their engineers. Another example of this engineering is the molded-in gyro mounting shelf with provision for rubber bands to retain the gyro also molded into the mainframes.

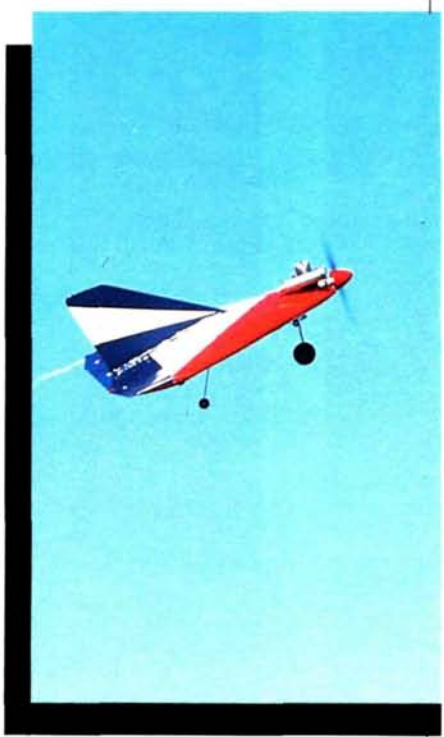
The kit includes Bell-Hiller mixing (a mechanical mixing of steering control for both the main rotor blades

(Continued on page 54)



Holy Smoke

Top Flite's latest contribution to the wild bunch!



ONE OF THE great things about this hobby is the seemingly endless variety of subjects available to model. My prime area of interest is in giant-scale, but I like to interject two or three sport models in between major scale projects, just to keep the interest level up. When Top Flite Models* introduced their new Holy Smoke 40, I knew this was going to be my next sport project.

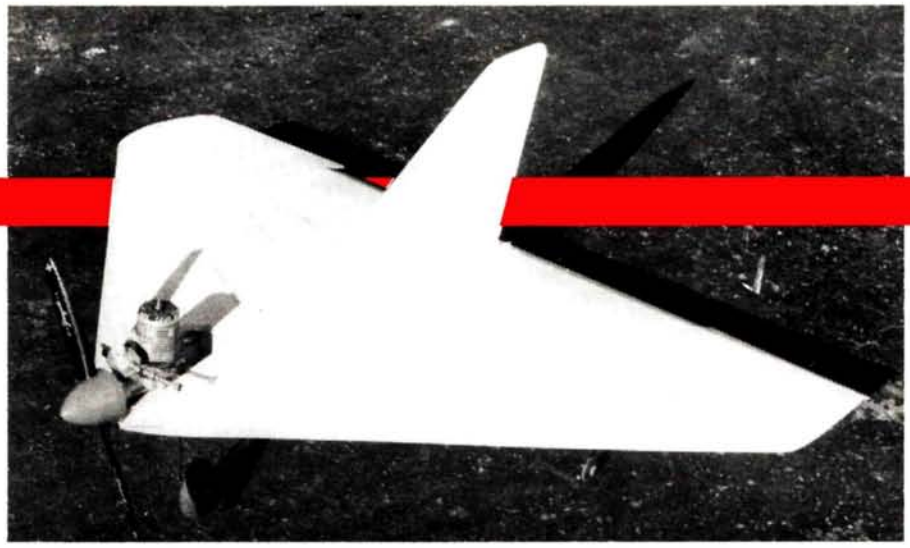
The Holy Smoke 40 is a true Delta wing designed to take engines of from .25 to .45 cubic inch displacement, and to use three channels of control, ailerons, elevator, and throttle. With a 36-inch wingspan, the aircraft is compact enough to fit in any car trunk and because it is a one-piece design, no disassembly is required. As compact as it is, the Holy Smoke packs in 586 square inches of wing area, and with a flying weight of 3½ to 4 pounds, the wing loading comes in at 13.8 to 15.8 ounces per square foot, a very light loading.

The airfoil section is 13% thick at the center, progressing to 16% at the tips. This results in good inherent stability and outstanding low-speed characteristics.

THE KIT. As with all Top Flite kits, the packaging is excellent. All

by GEORGE WOODS

SPECIFICATIONS
Type: *Sport*
Wingspan: *36 inches*
Wing Area: *586 square inches*
Engine: *.25 to .45*
Weight: *3½ to 4 pounds*
Channels: *4*



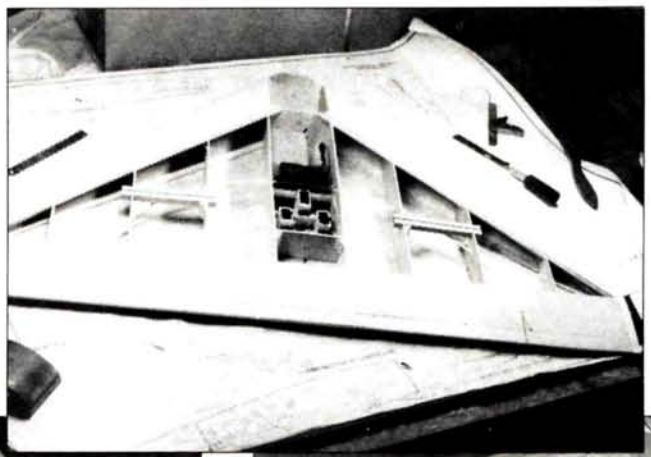
sheet and strip wood are banded or sleeved to prevent shipping damage and the quality of the wood, die-cutting, and parts identification are excellent. In my kit all the wood seemed to be selected to suit the intended use.

The 35x44-inch plans are rolled, a feature I always appreciate, particularly for an airplane that's built directly on the plan, like the Holy Smoke.

The hardware package is very complete, including all screws, washers, nuts, blind nuts, clevises, horns, hinges, and even the flexible cable pushrods for throttle, nose gear, and ailerons. Items you'll have to supply are few: a 2-inch spinner, ¾-inch diameter main wheels if you opt for them, a 2¼-inch diameter nosewheel, and of course whatever covering material you prefer to use. Lastly, there is a complete instruction manual to insure easy, accurate construction.

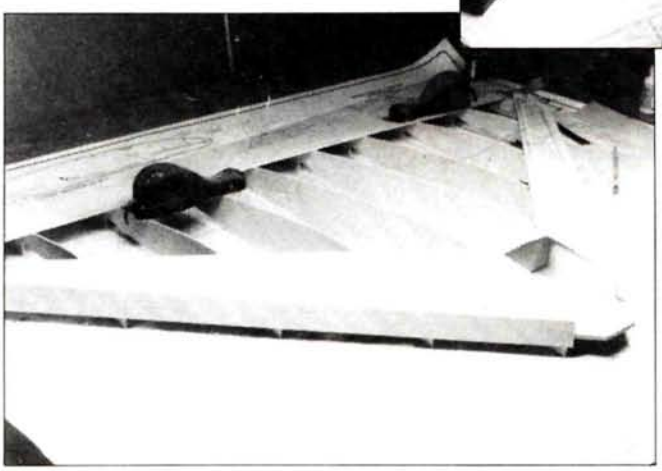
CONSTRUCTION. A necessity for true and accurate construction of the Holy Smoke is a flat and true building surface large enough to accept the wing. Top Flite recommends a 2x4-foot fiber-board ceiling tile or a piece of Celotex fiber board. Lay out the plans on your work surface, cover them with a clear plastic material, and you're ready to start building.

Construction of the Holy Smoke 40 delta is similar to building a conventional wing, except that the engine mount and radio compartment are included in the structure. A leading edge crutch is used to tie all ten wing ribs together and provide alignment. Construct this over the plans and add die-cut plywood plates to the top and bottom of the crutch nose to form the engine compartment floor. Add ribs to the crutch, 3/32x⅞-inch trailing edge strips, and finally four 3/16x⅜-inch wing spars. Glue ½x1⅛-inch balsa leading edges to the front of the crutch, completing the basic frame.

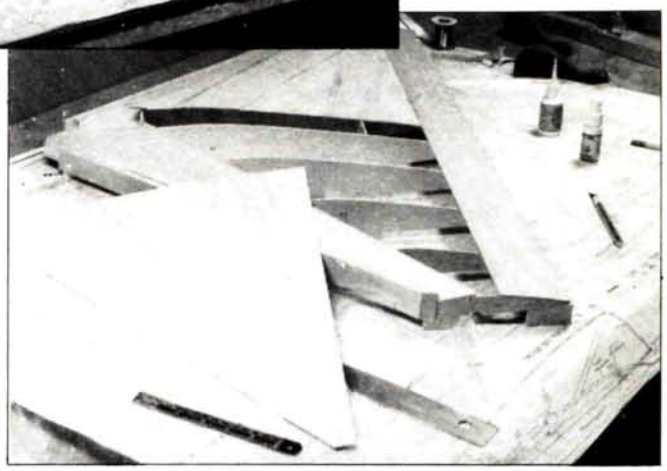


Cover the top surface of the wing with 3/32-inch sheet and then add the cowl blocks and the maple engine mounts. Turn the wing over and the radio compartment, servo rails, and tank

(Continued on page 104)



The Top Flite Holy Smoke does not require a large amount of space for assembly; even a card table will do.



Kit engineering assures correct alignment.

Control Tower

by CHARLIE KENNEY

THIS MONTH I'd like to continue my discussion of various electronic and other goodies seen at recent trade shows. I'd like to start with the McDaniel R/C* Model 180 lighting system. Let's start with a system description.

The 180 lighting system consists of the lamps, strobes, batteries, charger, wiring, electronic interconnection diagrams, and the digital proportional controller for sequential operation of all lights used for scale-like appearance on model aircraft.

The heart of the system is the unique digital controller used to turn On and Off, in sequence, all lights for wing tip, tail, landing, and strobes by remote control. There are no micro-switches incorporated for control of the lights. The operational sequence requires only the setting of a small potentiometer to select a desired "On time" for light operation. The digital controller comes pre-wired, except for the electrical connection to your radio system. This requires an extra servo type connector for the proportional control signal from your receiver to the controller and this must be soldered to the black and yellow twisted pair of wires. This connection provides the ground from your radio system to the lighting systems ground (black wire), and the proportional signal lead from your receiver (yellow wire) to the digital input to the timing circuit for On/Off control. There's no need for the 4.8-volt radio battery to connect the light controller. Since no radio battery current connects to the controller (only the signal), there's no drain of flight pack power. All current used for switching and lamp operations comes from the 6-volt battery supplied. This also eliminates any possibility of flight pack battery drain should a problem occur with the digital controller. You should also note the absence of an On/Off power switch, as the controller sets the On/Off functions, and if you turn off the controller using your transmitter control, the power is off. All switching is through grounds so no switch is necessary. If you want a switch, McDaniel R/C recommends placing it in the negative line from the battery pack.

photos by SUE KENNEY

McDaniel Light Set for military or civil aircraft includes navigation lights and strobes.

The wiring is simple. Just plug connector #1 into the digital controller. Connector #2 is the power lead for all wing lamps. Connector #3 is the power lead for all tail lamps. All 6-volt lamps have a common positive tie point, the large red #22 wire from the 6-volt buss on the PC board to pin #1 on connector #2, one lead from each 6-volt lamp must attach this wire equivalent; i.e., connector 2-1 mates to plug 2-1.

Now to the strobes. The orange wire from the battery (3.6-volt lead) is tied to a separate small land on the PC board that goes directly to connector #2 pin 2. This lead is intended for the strobes only. The black lead from connector #2, pin 3, is the ground for the strobes and returns to point "D" on the switching transistor.

Landing and navigational or position lights: (wing only). These are all wired in parallel. If one burns out, the rest will still light up. One lead from each light must tie to the single 6-volt buss line (one side is common to positive 6 volts). This is a #22 ga. red lead from plug #2, pin 1. All wing lamps (navigational and landing) tie to this buss. Tail light wiring polarity is not important. Finally, the Deans 2 pin connector is reversible.

System operation is as follows: The

McDaniel R/C 135R multi-function charger. See text.

Sonic Systems now offers four-cycle plugs.

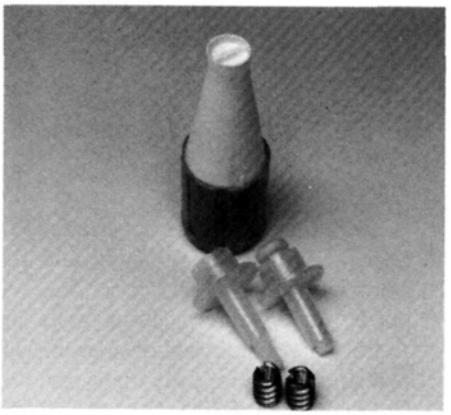
model 180 uses a single 6-volt/1,300-mAh battery pack for all lights, including the strobes. The battery pack is "tapped" at 3.6V for the strobe power.

Power is supplied to the wing, tail, and landing lights from a common line of +6 volts DC, only the grounds are switched through the controller.

The small switches on the digital controller PC board are used for navigational light timing selection. Switch #2 selects "partial On/full On." Switch #2 On means all navigational lights will blink from bright (full On) to dim (partial On). In the Off position, all navigational lights will blink full Off to full On. Switch #1 selects "civilian" or "military" navigational lighting. Civilian lights blink, while military lights are non-blinking. Use of this type of switching will permit you the versatility of one controller for all types of aircraft.

To set up the 180 system, visually locate VR #1 pot on the PC board (beneath the hole in the plastic case). This small poteniometer is used to select the timing position that you want for the navigational lights. Once this is set, the rest of the lights will "sequence On" at approximately .3 m/sec intervals. Let's say you set the transmitter control at 1.0 m/sec (for all lights to be off). Move the transmitter control to a position that looks reasonable for the first set of lights to activate.

Using a small screwdriver, set the potentiometer to "turn On" the wing tip and tail lights. Now move your control to the "Off" (1.0 m/sec) position, all lights should turn off. Move your control toward the "On" (2.0 m/sec) position. As you pass the previous position (where you set the potentiometer VR #1), the navigational lights should come on again. Continue toward the 2.0 m/sec position. Every .3 m/sec, another set of lights



Sonic Systems wing hold-down system and tool.

should come on. As you pass through the position for strobes to activate (approximately 1.5 m/sec), make note of the time required for the first flash to occur. This delay is normal and should take less than 5 seconds. The delay is caused by the charging of a capacitor. Normal flash time for synchronized strobes is approximately one flash per second.

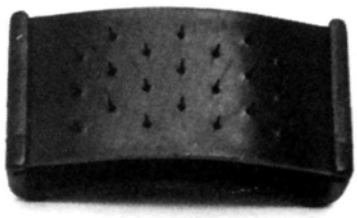
Xenon strobe assembly. Caution: Do not handle the PC board while lights are flashing or within 60 seconds of turning it off. High DC voltage is present and although it in itself won't hurt you, it might startle you or make you drop the PC board, thereby causing damage to the circuit.

Note: When extending the flash tube away from the PC board (up to 8 inches is okay), be sure to use minimum heat on flash tube ends and extend the flash trigger coil wire from the XFMR end, not the flash tube.

Navigational lights are 200 mA bulbs (four each), landing lights are 200 mA (two each), and the strobes average 500 mA for the pair, which is a total of 1,700 mA. The batteries supplied with the model 180 system are 1,300-1,500 mA cells and should power the system for 40 minutes at normal brightness before recharging is required. The lights will dim and the strobes will decrease their flash rate as the batteries are discharged.

The Model 180 Digital Light System consists of the following:

A. Wing tip and tail: four 200-mAh @ 6V 1 amp (100 mA bulbs are okay), four sockets, four lens covers, two wing tip (red and green), two tail (white and amber).



Craft-Air Prep Track for preparing sheet balsa prior to use of iron-on coverings.

SR 300-mAh, very compact, great for sailplanes and R/C cars.

B. Landing: two 200-mA @ 6V high intensity lamps, two mirrored reflectors (plastic). (Reflectors must have cooling air if enclosed.)

(Continued on page 89)

Engine Review Round-Up

by PETER CHINN

Super-Tigre S.21 Buggy-RS

Super-Tigre S.21 Buggy-RS features convenient rear-start cone.

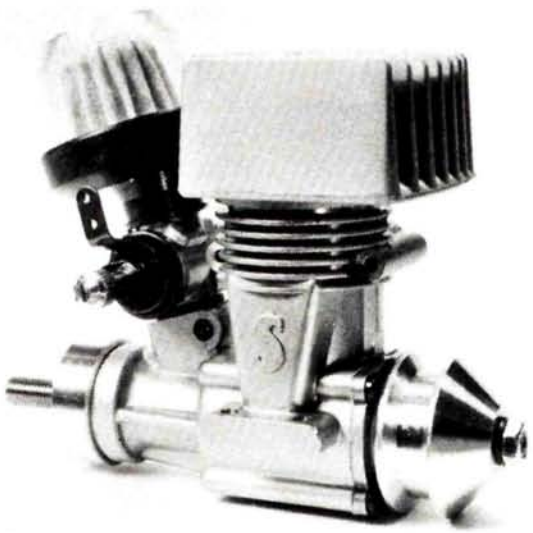
SPECIFICATIONS

Type: Air-cooled single-cylinder side-exhaust two-stroke-cycle with crankshaft rotary-valve and TST-Schnuerle scavenging.
Bore: 16.6 mm (0.6535 in.)
Stroke: 16.0 mm (0.6299 in.)
Displacement: 3.463cc (0.2113 cu in.)
Nominal Compression Ratio (full stroke): 8.5:1
Speed Control: Super-Tigre Mag automatic mixture control type carburetor.
Checked Weight: 356 grams (12.56 oz) including air cleaner, less muffler.
Mounting Dimensions:
Crankcase width: 28 mm
Length from driver face: 98.5 mm
Height above CL: 70.5 mm
Bolt-hole spacing: 38x15 mm
Manufacturer's Claimed Power Output: 0.80 bhp at 22,000 rpm.
Manufacturer: Super-Tigre s.r.l., 40065 Pianoro, Bologna, Italy.
U.S. Distributor: Great Planes Model Distributors Company, P.O. Box 4021, 1608 Interstate Drive, Champaign, IL 61820.

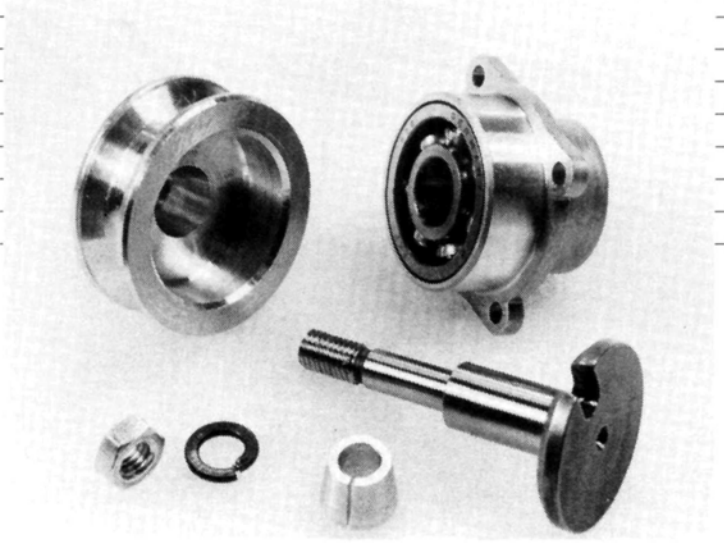
SUPER-TIGRE is Italy's oldest model engine factory. Owner Jaures Garofali began making engines on a commercial basis in 1943. Prior to that he had built individual engines of many types, beginning with a 6cc displacement spark-ignition gasoline engine back in 1938. The first "production" model Super-Tigre was designated "G.13" and was a side-port diesel having a displacement of 5.29cc (0.323 cu in.) derived from a bore and stroke of 17.5 mm x 22.0 mm.

Since that time, an immense range of Super-Tigres of every shape and size, from .049 cu in. to 3.62 cu in., has been produced. In the nineteen-fifties and sixties Tigres enjoyed considerable success in competition free-flight and control-line speed. Since then, engines for radio-control have been to the fore. They have powered World Championship winning pattern aerobatic models (Hanno Prettner) and also some of the fastest pylon racing models.

Over the past few years, Super-Tigre has also produced several model racing car engine variants, a number of which have been dealt with in these columns, although, currently, the factory's catalog lists only the "S Series" off-road engines.



S.21 Buggy-RS is also available in a .25 cu in. model. Both engines include special air cleaner shown.



Parts of rear-start assembly. Shaft is mounted in two ball bearings. Slot in drive disc engages crankpin spigot.

The latest offerings are the S.21-SL "Buggy-RS" engine, dealt with here, and its bored and stroked derivative, the S.25-SL Buggy-RS.

The "RS" suffix stands for "rear start." The RS is a development of the standard "S Series" off-road engines that preceded it but which did not have the rear start facility. This device is installed in place of the standard crankcase backplate. It consists of a rear shaft, driven by the crankpin, to which a combined cone and pulley is attached. It allows the engine to be electrically started by means of a conventional model engine starter, either with a spinner type rubber cup, or, where more convenient, with a short belt.

The backplate is replaced by a housing containing two ball journal bearings, an 8x22 mm inner and a 5x16 mm outer, which support the rear shaft. This has a 22 mm diameter drive disc, having a slot in its periphery to engage a 4 mm diameter spigot on the engine's crankpin. At the outer end, the shaft is fitted with a conventional split taper collet on which is mounted the 30 mm diameter aluminum starter cone, secured by means of a spring washer and 5 mm hexagon nut.

The rest of the engine follows orthodox Super-Tigre practice. The 12 mm crankshaft, supported, of course, in two ball bearings, has an 8.5 mm gas passage fed from a 14 mm long rectangular valve port. The rectangular intake boss is offset so that there is a tangential gas flow from the carburetor through the rectangular inlet port.

Remaining parts of S.21 Buggy-RS. Engine has ABC piston/cylinder assembly. Head is made in two parts.

The engine is of the ABC type with ringless aluminum piston (ABC was pioneered by Super-Tigre) and the chromed brass cylinder sleeve has a generous (2.2 mm) wall thickness giving more effect to the angled ports in directing gas flow. Cylinder porting is a variant of the Schnuerle scavenging system, in which the Super-Tigre "TST" system of twin upwardly inclined transfer ports, diametrically opposite the exhaust, are combined with angled Schnuerle ports each side. The ports register with well-shaped bypass passages in the main casting which is solidly proportioned and extends upward only so far as is necessary to accommodate the heftily flanged cylinder. The bore of the cylinder, in turn, is only long enough to contain the full-stroke of the piston, the combustion chamber portion of the head being flush fitting (as in all "S" series motors) instead of dropping into the top of the bore.

The head itself is made in two parts; a machined inner component with bowl-and-squishband combustion chamber, and a large rectangular pressure cast upper component with tall tapered cooling fins of large area, as befits a car engine deprived of the cooling slipstream from a propeller. There is a 0.10 mm (.004 in.) copper gasket between the head and liner flange and the assembly is tied down with four 3 mm slot-head screws.

The carburetor is a Super-Tigre "Mag" two-needle type with 7.5 mm choke diameter and 3.9 mm diameter spraybar giving a moderate effective choke area of approximately 16 sq mm. The carburetor is equipped with a paper element air cleaner. The element is contained in a transparent plastic case with a molded rubber base. This enables it to be simply pushed into the carburetor air intake, where it is neatly and securely held by a machined flange.

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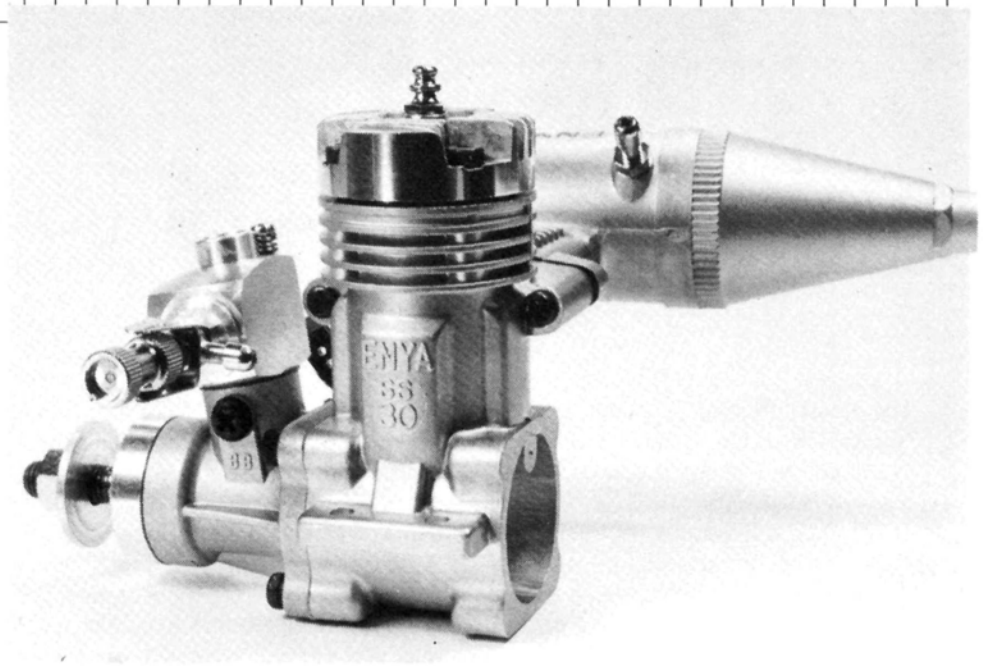
Engine Review Round-Up

by PETER CHINN

Enya Super-Sport 30 & 30-RING



Enya Super-Sport 30-RING, top model in the Super-Sport series, has twin ball bearings, Enya G-Type carb, and ringed aluminum piston.

SPECIFICATIONS

Type: Air-cooled single-cylinder side-exhaust two-stroke-cycle with crankshaft rotary-valve and Schnuerle scavenging.
Bore: 19.0 mm (0.7480 in.)
Stroke: 17.0 mm (0.6693 in.)
Displacement: 4.820cc (0.2941 cu in.)
Nominal Compression Ratio (full stroke): 11.5:1-12.0:1
Speed Control: SS-30—Enya standard airbleed type carburetor with 5 mm choke; *SS-30-RING*—Enya "G-Type" automatic mixture control carburetor with 5.5 mm choke.
Checked Weights: SS-30—211 grams (7.44 oz) bare, 259 grams (9.14 oz) with Enya M251 muffler; *SS-30-RING*—227 grams (8.00 oz) bare, 275 grams (9.70 oz) with M251 muffler.
Mounting Dimensions:
Crankcase width: 29.5 mm
Length from prop driver face: 72.5 mm
Height above CL (less glowplug): 58.5 mm
Bolt-hole spacing: 37x15 mm
Manufacturer's Claimed Power Output: SS-30—0.6-0.75 PS less muffler, 0.5-0.65 PS with muffler; *SS-30-RING*—0.7-0.85 PS less muffler, 0.6-0.75 PS with muffler.
Manufacturer: Enya Metal Products Co. Ltd., Nerimaku, Tokyo 176, Japan.
U.S. Distributor: Altech Marketing, P.O. Box 286, Fords, NJ 08863.

IN 1956, the Enya brothers, whose Enya Metal Products Company had then been making model engines for about five years, introduced two motors that, more than any other, were responsible for bringing Enya engines to the notice of serious model builders outside Japan. One was the Enya 15-D, a compression-ignition engine which, breaking completely with orthodox European model diesel design, came nearer than any other 2.5cc contest diesel, at that time, to equalling the hitherto unchallenged British Oliver Tiger. The other was the Enya 29 Series III, a bushed-bearing glowplug engine that, on test, proved capable of outpacing almost every other 29 of the period.

The Enya company has always had a 29 in its product list. The 29-III was eventually succeeded by the 29-IV (ironically, this failed to equal our 29-III in tests) and 29-IVB, and then by the present 29-V model in both plain bearing and ball-bearing versions. All these have

Basic Super-Sport 30 has bronze bushed main bearing, standard airbleed carburetor, and lapped cast-iron piston.

Super-Sport castings are used for smaller displacement SS-25 models as well as 30. Parts shown are for 30-RING.

been traditional crossflow-scavenged engines but now, with the Super-Sport 30, the Enya company has moved over to the Schnuerle-plus-third-port scavenging system that has been a feature of all its more recent two-strokes. Incidentally, notwithstanding the "30" designation, this is still a "29": its 19x17 mm bore and stroke give a displacement of 4.820cc or 0.2941 cu in. (Actually, just for the record, Enya "29s" have all been .30 rather than .29 cu in. They all use a nominal 18.7x17.9 mm bore and stroke, indicating a swept volume of 4.916cc or almost exactly 0.300 cu in.)

Engine buffs who think that the new Super-Sport 30 looks just like the Super-Sport 25 featured in the July *M.A.N.* are absolutely right. Both engines are available in a choice of bushed-bearing and ball-bearing models. The former are virtually identical externally in both displacement sizes, while the ball-bearing models are similarly related. However, whereas both 25s have lapped cast-iron pistons, the ball-bearing version of the 30 shown has a ringed aluminum piston.

Here we should mention that this is not the whole story, as there are also two other related Super-Sport models. First, the ball-bearing SS-25 is manufactured in a special, slightly more powerful, version, known as the "25 Al-Chrome" model, which has a ringless aluminum piston running in a chromed-bore aluminum cylinder-liner. Second, the ball-bearing SS-30 is also listed with the option of a lapped cast-iron piston, instead of a ringed aluminum one. In this

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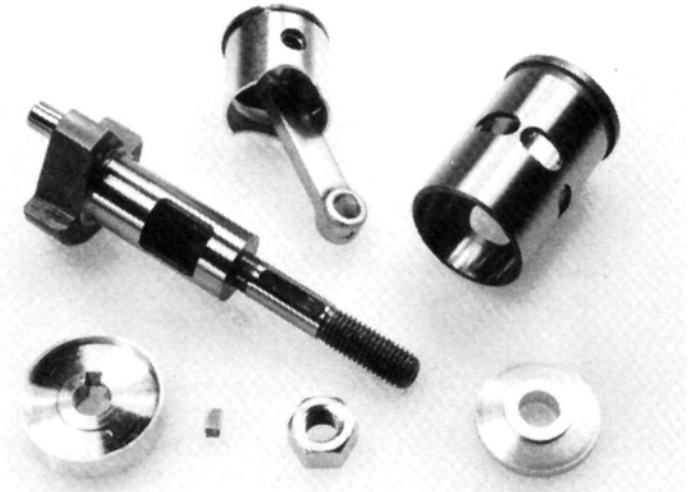


Crankshaft and piston/cylinder components of the Super Sport 30-RING. Note sturdy crankshaft and quality finish.

Left: Dr. Keith Shaw of Ann Arbor, Michigan, brought an electric-powered version of the deHavilland Comet. Model weighs 7½ pounds. Right: Pair of twins was flown frequently during the festival and both performed extremely well.

IMAA Festival '86

by DICK PHILLIPS

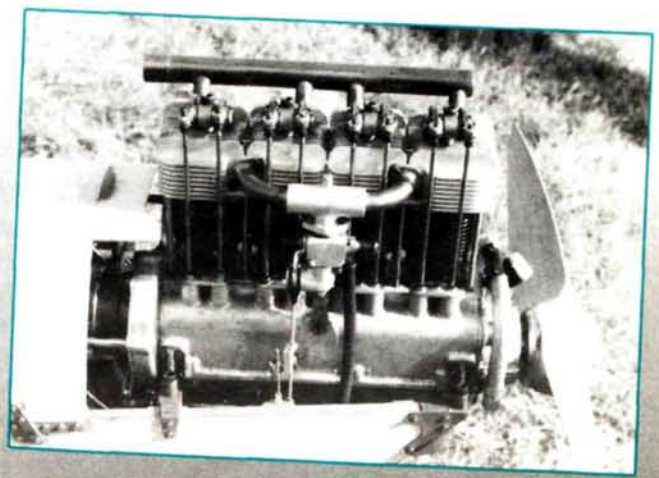
IMAA'S 1986 FESTIVAL, known as "the rally of the giants," is history. It took place on a hot, humid weekend in July in Lansing, Michigan, and it's a festival that the IMAA people won't forget for quite a while.

Festival '86 was a medium-sized event; not as large as IMAA's largest, but not the smallest either. There were 85 pre-registered pilots and a total registration of 115 pilots. Many superb models were shown and flown, and the increase in quality is more and more evident each year. The ability of the pilots is also on the rise. There were many flights which demonstrated the precise and exacting skills required to fly a modern, high-performance model airplane.

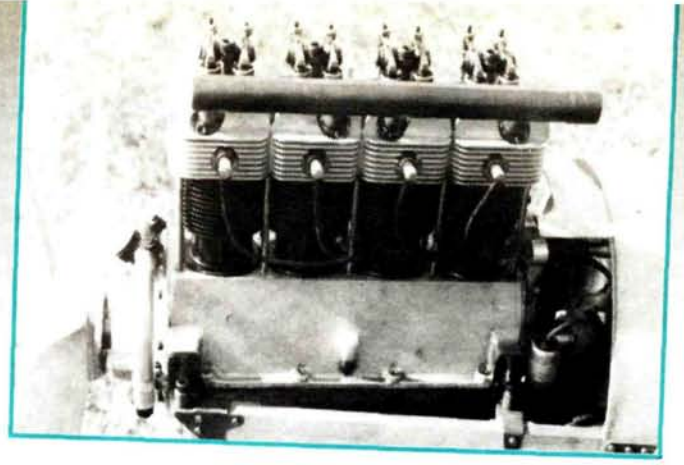
A first for an IMAA festival was the flights of several electric models. "Crash" Evanson from St. Paul, Minnesota, was the first to try an electric airplane and his own-design trimotor performed well in relatively high winds. The two pusher motors could be shut down in flight and the single tractor prop was sufficient to keep the model in the air. Crash's nickname, incidentally, stems from his prowess with motorcycles rather than model airplanes.

Dr. Keith Shaw of Ann Arbor, Michigan, flew his electric-powered DeHavilland Comet at the festival, and it was eerie. The model spans 88 inches and weighs a mere 7½ pounds. Having been around internal combustion engine-powered airplanes for so many years, it was an awesome experience to watch Keith's model fly silently. You kept expecting him to turn the model onto final for landing, dead-stick. However, such was not the case; he put on a dazzling display of aerobatics, all in absolute silence. If the art of electrics is still in its infancy, as some claim, then we'll see some very interesting electric flying in the years to come.

Merritt Zimmerman of Cleveland, Ohio, was another craftsman present. Merritt is one of those people we all envy. He's a machinist and, from the look of the work he does, a master of the craft. Some years ago he built a Gypsy Moth, powered by a four-cylinder in-line engine of his own design and manufacture. At Toledo some years ago he was made an offer he couldn't refuse by a gentleman from Japan and that model now flies in the sight of Mount Fuji. Merritt is in the process of building another for himself, and while the model is still under construction, the engine has been run. It swings a 20x14 prop at 6,000 rpm and *that* has to be convincing. The engine is nothing short of a little jewel. In Merritt's hands, it starts in a few seconds and runs like a dream. The



Left: Steve McLain and Al Heim show off the size of their creation. Flying weight is 55 pounds, the maximum. Right: Merritt Zimmerman created this beautiful example of workmanship by way of this four-cylinder, four-cycle



Left: Zimmerman is shown here tweaking his engine that turns a 20x14 prop at 6,000 rpm. Right: Another *view of Zimmerman's masterpiece shows oil dip stick, spark plugs, and filter capacitor.*

engine is spark-equipped and seems very reliable. The idle is awe-inspiring and that Gypsy Moth is going to be very impressive as it swings onto final with that big prop just ticking over at under a thousand revs.

Bob Campbell was present with his ¼-scale P-38, a most impressive bird. It could not be flown at the festival, of course, as it greatly exceeded the 55-pound weight limit.

Another very large model (this one under the 55-pound limit) was flown from the main runway in order to provide adequate runway and air space for the pilot. This model of the old Bamboo Bomber of WW II (UC-48? I never could keep those numbers straight) was most impressive in the air. From a distance it was impossible to tell it from the full-scale version and it was very well flown by its builders, Steve McLain and Al Heim of Wyandotte, Michigan. The big twin tips the scales at an exact 55 pounds, took just over two years to construct, and used what appears to be a couple of acres of Permagloss Coverite to finish. The Bomber used two Quadra 50s for power and flew with great style. There has to be a lesson here somewhere, something about it being possible to build a very large model without it weighing a ton. The structure inside this model illustrates very well that it's possible to build in strength without using either oak or concrete.

Some other things caught my attention at Lansing. I was surprised at the number of people who don't range-check before flying, particularly under the weather conditions we had. Temperatures were in the 90s and models sat out in the sun where the temperature inside the fuselage must have been close to 200°, especially those models that were painted darker colors. I did some tests some years ago on a model that was painted black and the temperature inside that fuselage once got to 160° and that was in an ambient temperature of 73°. I'd be willing to bet that the temperature at which many of those radios were expected to operate probably exceeded the maximum recommended operating temperature. This could be a dangerous practice so if you're flying under such conditions, make sure your model is kept in the shade except when it's being flown. And remember to range-check before every flight!

I can't say this festival didn't have its kinks. The principle problems were with the site and with preparations for the event. The site was the Grand Ledge (Michigan) Municipal Airport, which remained open during the festival. This condition naturally affected the flight line for the festival and the extent of the area in which model flight was permitted. As for the layout of the flight line and adjacent areas, well, suffice it to say it was cramped and barely legal from an insurance coverage standpoint.

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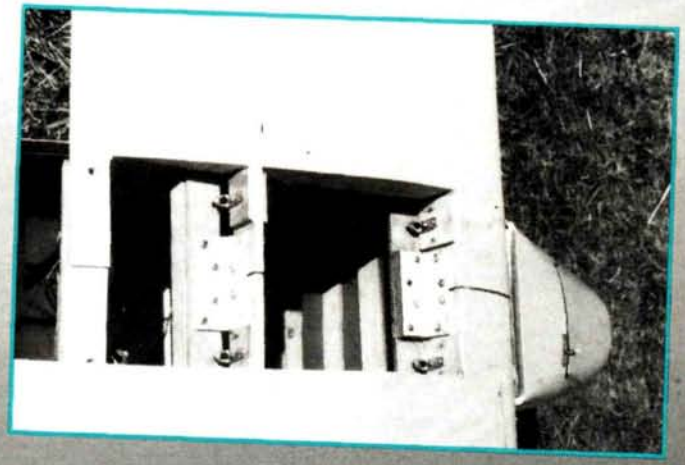


Left: Moraine Saulnier by Dave West of Perry, Ohio, constructed from Balsa USA kit, weighs 16 pounds with Saito 270 twin for power. Right: One modeler's method of joining wing halves utilized aluminum channels, this on a large Spirit of St. Louis.

Basics of Radio Installation

by DAN SANTICH

INSTALLING A radio system in a model is one task that most modelers don't look forward to. It takes a bit of time and it does not really contribute to the appearance of the model. The only time anyone sees it is either when you have the insides exposed or you crash!

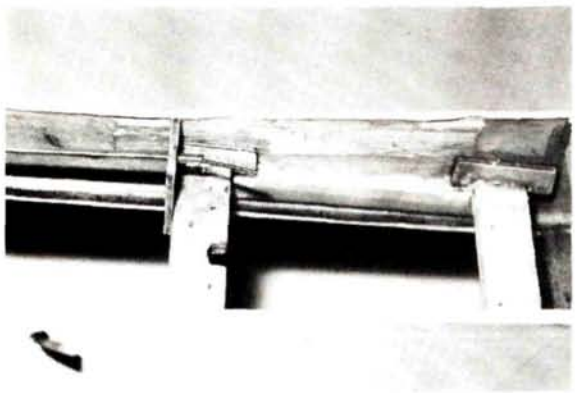
Obviously, radio installation is a necessary evil that we must cope with if we are to fly. Even almost-ready-to-fly kits often leave the radio installation up to you. Of course where ARFs are concerned, the radio installation is about the only place where your craftsmanship can prevail!

After building a few models, every modeler develops his own technique for the various chores of radio installation. Some find little hints that make the job easier or more convenient, and you will too as you become more proficient.

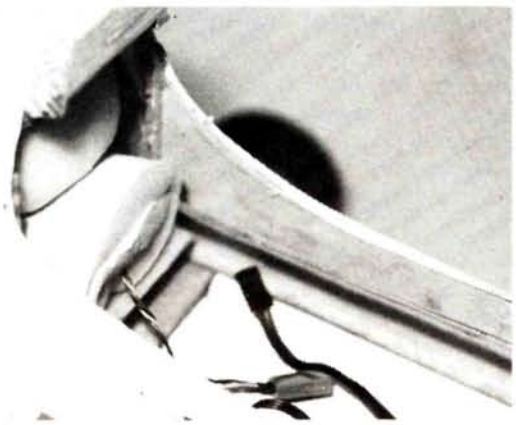
First, consider the components of an airborne system. You have a battery, a switch, a receiver, and servos. The first consideration must be engine vibration, the second proper balance of the model, the third G-forces to be encountered by the model, and the last crash protection. Certainly the latter can't be a 100% guarantee, but you can help out somewhat.

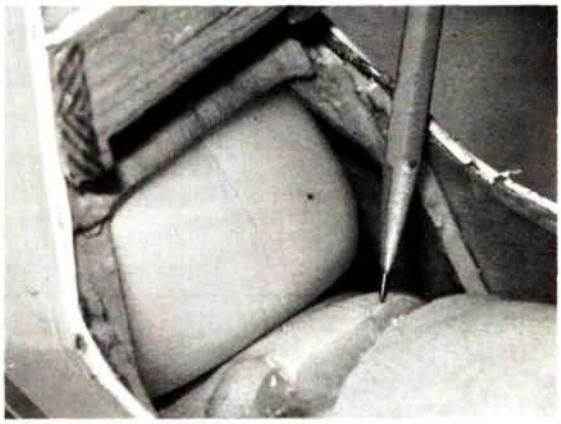
Engine vibration is first on the list because it can kill your airplane very quickly. What does vibration do? First, your battery, which is usually located closest to the engine, is full of chemicals and plates that are separated to very close tolerances. Vibration can cause a chemical disruption and can also cause the plates inside the battery to short out. The wires that are soldered to the battery can fatigue with vibration and the batteries can even rotate inside their housings, causing an internal disconnection.

Vibration can also do a number on your receiver. Think about all those solder joints! Every electronic component in your receiver is soldered to something, and the components themselves often have very fine wire leads that are soldered to a printed circuit board. Think about what vibration can do to these and you'll realize the need for proper insulation. The most sensitive element in your receiver is the crystal. It's the heart of your entire radio, and if it doesn't function properly you are in trouble. Vibration can shake these high precision devices to the point where strange things will happen with your model that you might think were caused by interference. With too much

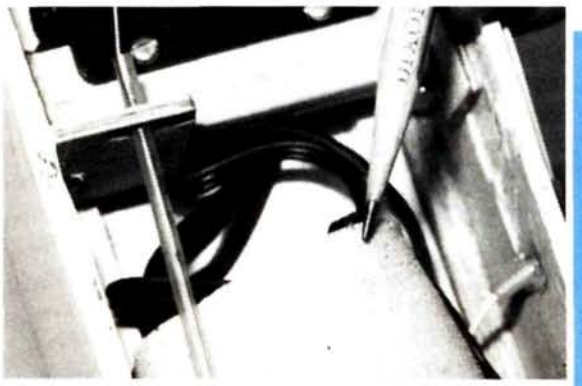


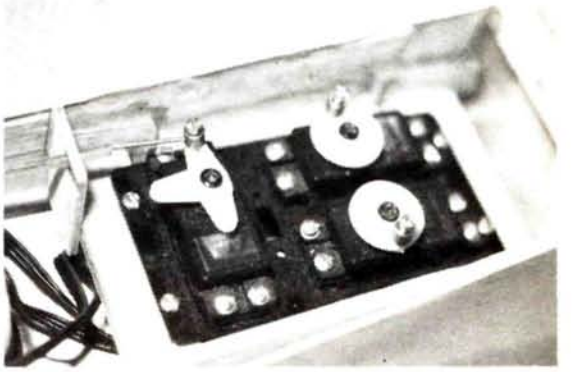
Left: Servo rails should be ¼-inch ply minimum with support brackets. Right: The heart of your airplane is your receiver and should be protected with foam padding.



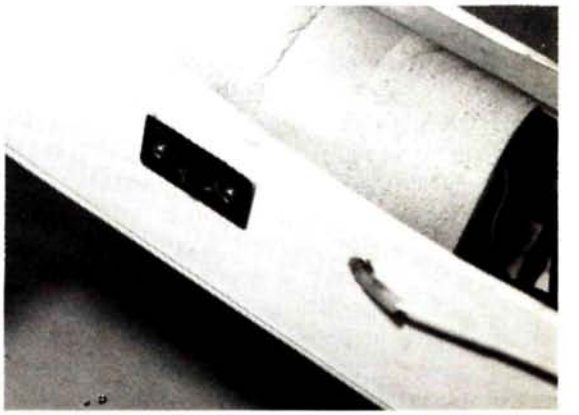


Left: Battery should also be foam protected and sealed when placed near fuel tank. Right: Receiver and battery should be snug, but not tightly packed.





Left: Padding for radio components can be any foam rubber material. Right: Whenever possible, use servo-mounting trays provided with radio.

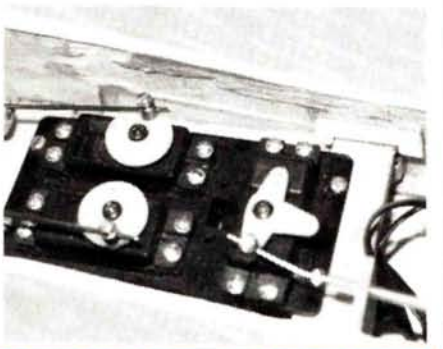


Left: Antenna should have protection as it exits fuselage. Right: Switch should be on opposite side of exhaust.

vibration they'll either cease operating or even shatter internally.

Another problem that crops up with vibration is servo failure. Here again you have a number of components that aren't designed for such abuse, the first of which is the gear train. Vibration within the housing of the servo allows the plastic gears to work against each other in a way never intended. For example, if you place anything on a flat surface and induce vibration, what happens? The piece on the surface will dance all over the place. Now, if you put another object with it, it too will begin to dance, but never in the same direction or manner. This is what happens to the gear train. Those little plastic gears are all trying to dance to a different drum, and while doing so are rubbing against each other. It doesn't take long before they wear out.

Another problem with vibration and servos is the feedback pot. Inside these pots are wipers that make electrical contact with a circular strip of conductive material. They must make constant contact with the strip in order to operate normally. Vibration causes the wipers to "bounce." This movement then creates a confused, if only temporary, signal to the servo. Sometimes it will jitter, jump, stall, or travel in reverse. Over a period of time, this bounce of the wipers causes permanent damage to them and to the wiper board and the servo develops "deadspots." So, not only can vibration give your servo a fit, it can also lead to disaster.



Servos should be mounted so that outputs clear wing.

As you can see, the proper mounting of a radio system in a model is paramount, and vibration, more than anything else, must be a primary consideration.

Another thing you must consider when installing a radio is balance. Certainly, if your model is not balanced properly it will not fly correctly, vibration or not. But so far as the radio installation is concerned, the balance point of your model is often determined by the proper placement of

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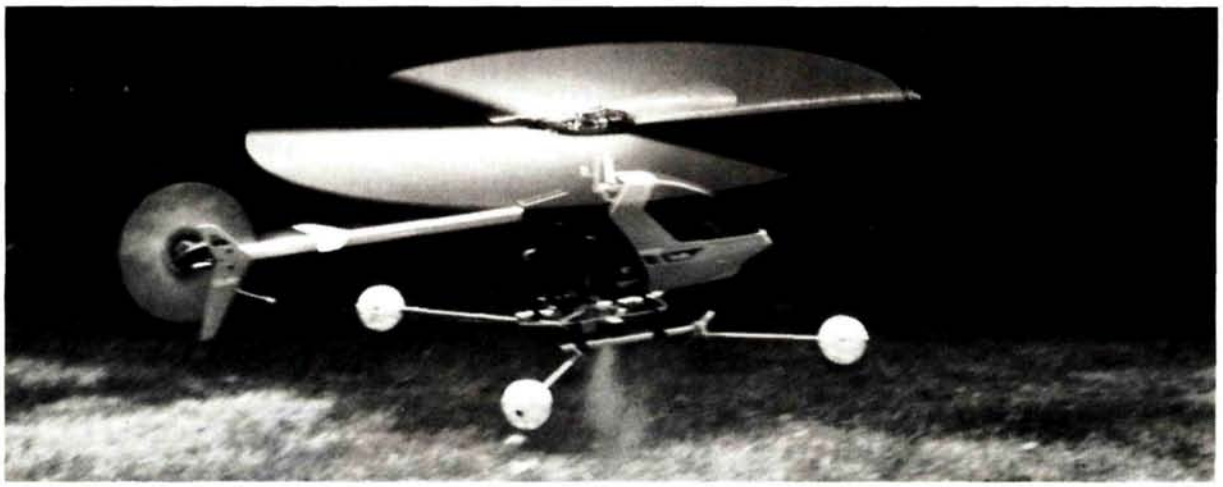
Basics of R/C Helicopters



by DR. DAVID TROST

I'VE MENTIONED in the past that 50% of learning to fly a helicopter is learning how to build it and set it up correctly. Last month I discussed assembly, so this month I'll talk about the correct setup, which is just as important as careful assembly.

First, all linkages should be as short and straight as possible. Links should be threaded on the pushrods at least 4 mm to prevent them from pulling out. Set up the servo arms so that, at neutral, the pushrods are prependicular to them. Also set up any bellcranks perpendicular to their pushrods. Helicopters are set up so that they will break ground at mid-throttle stick. For this reason the tail rotor servo is adjusted with the throttle in this position.

Set the tail rotor pitch as stated in the assembly manual. If the manual doesn't have a suggested pitch setting, start with about 5°. This will be adjusted later. The main rotor in a collective pitch machine is symmetrical between both blade pitch mechanisms. These pushrod and lever arrangements must be the same on both sides or there will be differential throws between the blade pitches. An easy way to do this is to match the lengths of each similar pair of pushrods as they are installed. Make sure that none of the rods bind at the ends of the travel. If they do, the links might pop off in flight. Set the main rotor pitch as in the manual or set it for +4° at hover and adjust the radio end points or the linkages so the top pitch is +7° and the low pitch is -3°. These are rough starting settings and will probably be changed after the machine is flown. These pitches can be measured with one of the many pitch gauges on the market. If you don't own a pitch gauge use a protractor and estimate the settings.

One of the most difficult areas of helicopter adjustment in a collective pitch machine is the pitch/power curve. The object is to keep the rotor speed relatively constant throughout all aspects of flight. This can be difficult to achieve. One general principal is that it's better to err on the side of too much power (i.e., more rotor speed) rather than too little. Helicopters don't fly well if the rotor speed is too low. To prevent this, the power must be brought up quickly from idle and the pitch increased more slowly. The power increase should lead the pitch increase. Set up the throttle linkages so the carburetor is fully closed at low throttle with low trim and so that the barrel is about 60% open at hover with high throttle trim. These settings will be adjusted later after the first hover. Fixed pitch helicopters should have the throttle set up the same as described previously and about +4° of main rotor blade pitch.

Make sure the controls move in the right directions. The swashplate should move in the same direction as the desired motion of the helicopter; forward for forward, right for right, and so on. Throttle and collective pitch should both increase as the stick is moved forward. Tail rotor is set so when the rudder stick is moved to the right, the helicopter's nose moves to the right. If a helicopter radio is used, check that the Automatic tail rotor control system is set for proper operation, increasing tail rotor pitch as the throttle stick is advanced.

Be sure that the gyro is hooked up to counteract the tail movement of the machine. If the gyro isn't correcting the right way, change the direction of travel at the gyro, if possible. If not, a reverse rotation servo is necessary. Mount the receiver and battery firmly with plenty of foam rubber.

Paint the canopy a bright color for good visibility; yellow is one of the best. When the machine is finished make sure every nut and bolt is tight and that everything without a locknut is secured with a liquid locking compound.

There are several ways a novice R/C helicopter pilot can learn to hover his machine rapidly and inexpensively. The main object of training aids is to prevent or minimize damage to the helicopter during the process. The two main training aids are the training stand and training gear. The training stand is a device which is fixed firmly to the ground and the helicopter is bolted to a pivoting plate which allows limited motion on the pitch and roll axes. It also allows rotation on the yaw axis. The pivot can rise about 18 inches so vertical training is possible. Damaging the helicopter while using a

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CIRCUS CYCLONE

(Continued from page 36)

and the stabilizer paddles, giving the helicopter more response to rotor head steering control), collective pitch (changing of main rotor pitch to increase or decrease lift), molded plastic tail rotor blades, pre-finished main rotor blades, and all of the hardware to connect to your radio system, such as control rods and links, molded ABS plastic body, decal sheet, and great instructions. There are *no* wooden parts that require assembly and finishing on the Cyclone!

The instruction booklet for the Cyclone is Kalt's best effort to date. This booklet takes you step-by-step through assembly, and also includes some great setup and maintenance tips. Each step is laid out in a logical order, and should be followed exactly. Whenever necessary, an assembly drawing is included to clear any confusion.

I'd like to share a few things I learned during construction. There is no mention of the use of a thread-locking compound for non-nylon insert locknuts. Use a good thread-lock compound, like Loctite, anywhere that the bolt or setscrew fastens to an all-metal threaded part. Also there should be some mention on page 8 of the assembly manual that the possibility exists of having to match your particular engine to the engine mount. The only two examples given are for the O.S. .50 and the Enya .49. There are other engines available that will work well in the Cyclone, and the mount provided will work with most engines in this size class. You'll need to pay attention to the correct placement of the mount in order for the clutch to line up properly.

The kit comes neatly packaged in a colorful box, and inside you'll find that the packaging is as well thought out as the rest of the machine. All of the large components are either fitted into the inner packaging or are wrapped in protective plastic. All of the small parts are separated into numbered bags which correspond to steps in the assembly manual. If you think you're missing parts, look through all of the larger parts. Often there is a small part taped to a larger part, or inserted into a package with a group of parts.

CONSTRUCTION. The Cyclone really is fun to build because it's not one of those ordeals that will drag on forever. Expect to spend two to three evenings completing the ship if you're only mildly motivated. When I built my first Cyclone, in just over 4 hours the ship was ready to go. Keep in mind that I've built many machines and that I was very excited about building the Cyclone.

I'm not going to cover all of the assembly details because the manual will cover them much better. I will, however, add a few notes to further help with some of the construction steps.

If your engine doesn't include a throttle lever extension, you'll need to modify the throttle linkage installation. After the engine is installed in the mainframes, drill a ¼-inch hole through the frames and the cooling shroud in a straight line from the throttle servo to the throttle lever on the engine. Be sure to turn the throttle lever so that it points down, and be sure to drill the hole under the cooling fan. Don't overenlarge the shaft hole in the cooling fan. If you own a drill index, use the correct size drill instead of the tapered reamer. Use thread-lock on the clutch bolts and setscrews.

After you have all of the parts on the

(Continued on page 62)

Hobby Shack

FOCKE-WULF FW190

A warbird joins the EZ kit lineup.

by CHRIS CHIANELLI

photos by LOUIS V. DeFRANCESCO JR.

The latest EZ from Hobby Shack is very accurate in scale markings.

ON JUNE 1, 1938, the first Fw 190VI carrying the code letters D-OPZE was flown with Focke-Wulf chief test pilot Hans Sander at the controls. Sander describes his feeling as love at first flight: "I have flown some beautiful aircraft in my time, but I cannot recall one that impressed me more than the delightful Fw 190 from its very first flight." Numerous sources, both Axis and Allied, confirm that the machine was light on the controls, and fantastically well balanced with an excellent turning radius (outclassed only by the venerable Spitfire in this one particular aspect) and a very quick acceleration.

Had the Fw 190 not been plagued with its one major teething problem—engine overheating—which greatly delayed its serviceability, the European air war, in particular the American

A four-stroke engine, in this case the O.S. FS-90, complements this warbird.

daylight raids over Germany, the entire Allied offensive would have cost much more in terms of time and loss of life.

As I see it, the new EZ Focke-Wulf represents a final and decisive blow dealt by Hobby Shack* in their own effort that started years ago with the introduction of the EZ line. Their battle is to gain broad-based acceptance of the ARF by the modeling masses as a viable means of getting into the air and staying there with a semi-scale, 90%-completed model. In this respect, the EZ Fw 190 has uttered the last word. Even my most dogmatic, die-hard, dyed-in-the-wool modeling buddies have yielded to the logic. While you're working on your all-out scale twin or pattern ship, why not have a beautiful-looking, ready-to-go model to sport around instead of a boxy look-alike that probably takes longer to build? Virtually everyone I've spoken to, including the skeptic nonbelievers, wants this bird and that's not surprising. From a looks standpoint, the Fw 190 is, in a word, nasty. It has always had its own brand of sinister beauty, kind of like the creature in the movie *Aliens*. From its stance on the ground to its name, everything about the Focke-Wulf is predatorial in nature.

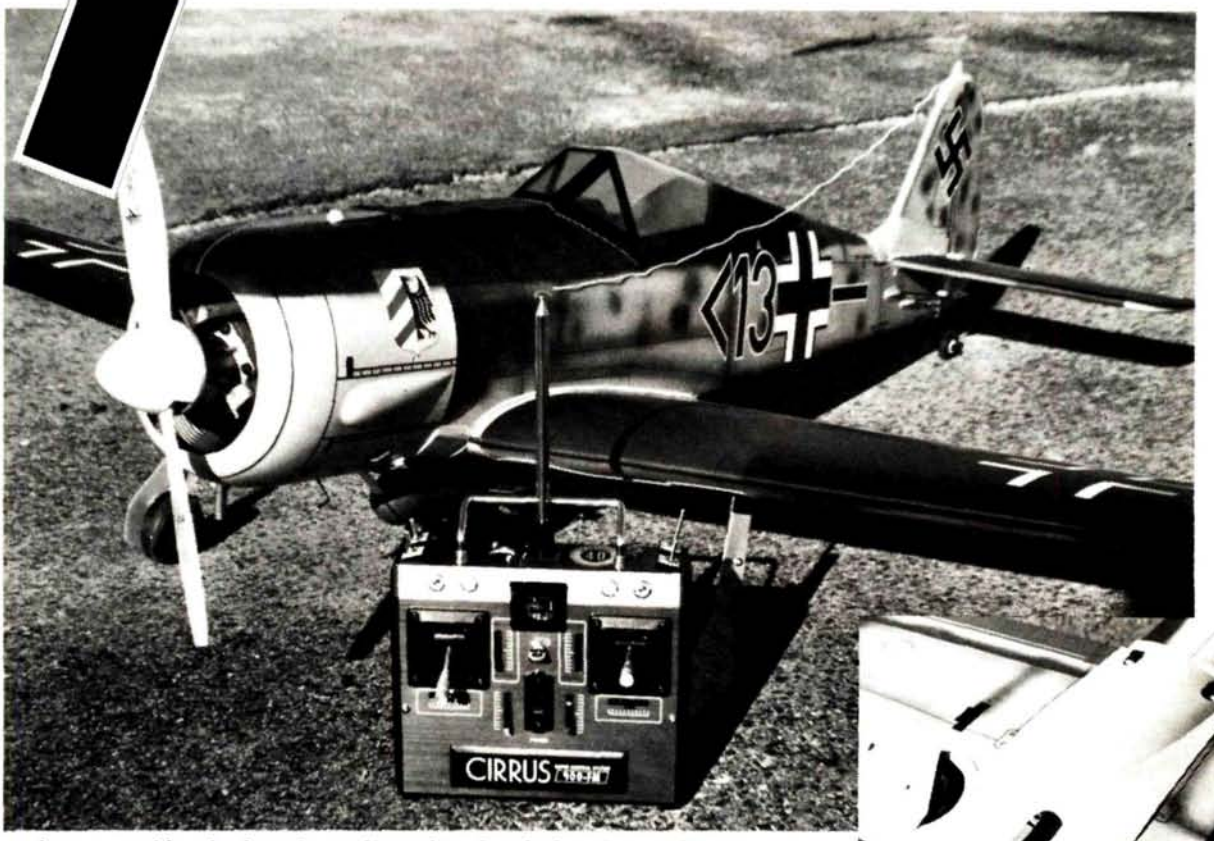
Retractable gear, also from Hobby Shack, worked flawlessly.

THE KIT. The EZ Focke-Wulf, like the entire EZ line, shares the time-proven, lightweight, triple-layer skin stretched over an inner balsa and ply skeleton. All surfaces are pre-hinged, save the rudder, which is pre-slotted. The finish comes as you see it in the photos, with panel lines and all. I added panel lines to the cowl with a permanent marker instead of using the striping tape supplied. I also gave the cowl a coat of Coverite* Black Baron flat clear, because the finish here was more glossy than the rest of the model.

Distinctive markings are pre-applied.

As usual, everything you'll need for a finished model is included,

FOCKE-WULF FW190



The new Hobby Shack Focke-Wulf combined with the Cirrus radio was a very enjoyable project for the author.

With gear in retract position, gear fairings fit nicely. Note bomb release.

except radio and engine, and all parts are neatly bagged and sorted according to corresponding subassemblies. The optional retracts I used, also available from Hobby Shack, are positive lock up and down units of aluminum and glass/epoxy.

CONSTRUCTION. I built the 190 on a Saturday and Sunday while the words of our publisher, Louis DeFrancesco Jr. echoed in my brain, "The Focke-Wulf will fly Monday!"

I did all phases of construction—what few there were—with Pacer's Zap and Zap-A-Gap, with their new Flex-Zap for things like the dihedral braces. All steps of the construction are quite simple, and well spelled out, diagrammed, and photographed in the instruction booklet, but I'll mention a couple of deviations of my own.

The O.S. FS-90 mounted well in the airframe and required no additional nose weight.

Instead of using the metal wing hold-down bolt and blind nuts supplied, I opted for nylon bolts. The holes that are already drilled for you in the wing hold-down bolt block are just the right size for a ¼-20 tap. Simply tap the hole once, coat the threads in the wood with Zap, let them dry, and re-tap. This makes for very hard and strip-proof threads in the blocks.

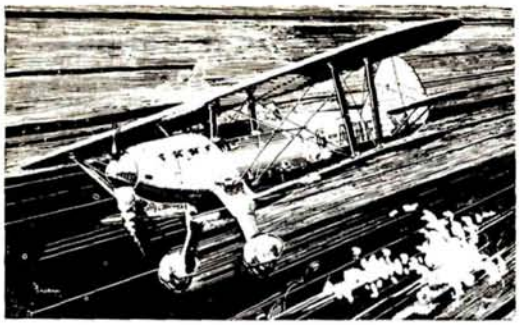
As I've done with other EZ kits, I positioned the pushrods *before* I glued in the stab. This makes life so much easier, instead of snaking the Y-elevator pushrod through the fuselage after the stab is on. I really think a change in the construction sequence would help a little here.

I also substituted the stock wheel with the ultra-light Ace R/C* 2¼-inch military wheels.

The finished model, with an O.S. FS 90 from Great Planes Model Distributors* and a Cirrus 7-channel FM radio from Hobby Shack, was 6 pounds, 3 ounces. With the battery pack over the tank, the Fw 190 balanced slightly nose-heavy, but I left it this way for initial flights. Incidentally, two servo trays are included. One puts the servos forward if a lighter two-stroke is used and the other fits in the case of a four-stroke.

FLYING. It seems the designers of the EZ line have hit on an airfoil/moment/surface area formula that works. I've flown all the .40 two-stroke/.60 four-stroke size EZs and up, and all fly extremely well. These design traits are carried over in the Focke-Wulf. The model flies not unlike a pattern ship in that it is a very predictably smooth craft. It does, however, bleed-off speed more

(Continued on page 123)



The Golden Age

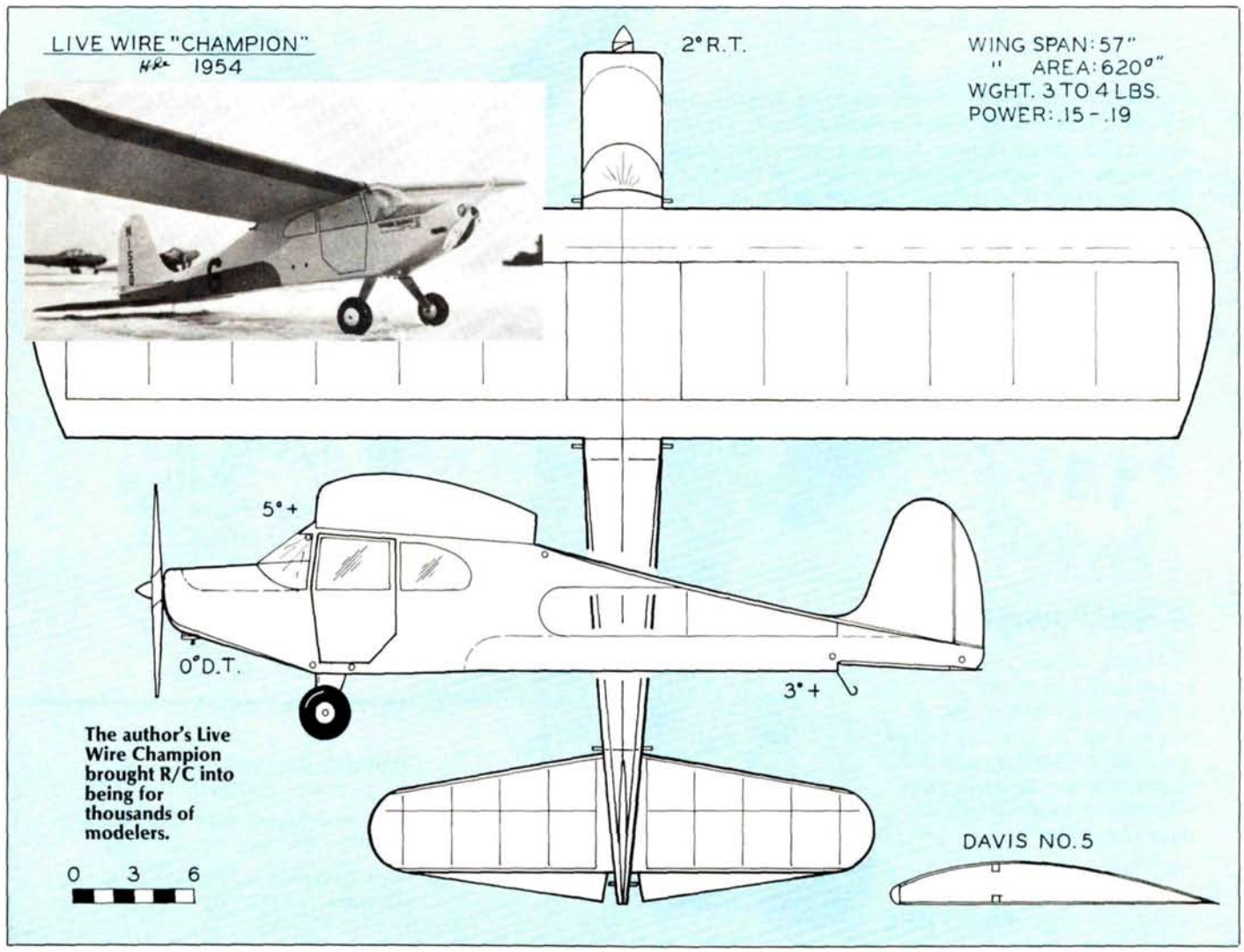
by HAL "PAPPY" deBOLT

OURS IS a world of constantly changing "things"—cars, machines, furniture, even planes—that come and go with abandon. Most new things don't seem to fit the long-term bill. Occasionally something, such as the VW Beatle or the J-3 Cub, has that magic combination that leads to an extended life. We've had a few R/C models that lasted the test of time. The Carl Goldberg Falcon, lately the Sig Kaydet, and the Live Wire Champion come to mind. Of these, the Live Wire Champ enjoys the best longevity record, having been in production for over 30 years! Why it's lasted deserves consideration.

The Champ almost didn't get into kit form. Some specific ideas went into the prototype, but when the decision to kit it was needed there were serious doubts and delay. It was conceived in a period of change. Fully aerobatic designs were just appearing and the entire R/C world was excited about the first inverted flight, first outside loops, and all the rest. The Champ was really just an updated version of the original Live Wire. Where would such a simple design fit into the expanding R/C scene, especially when some hot aerobatic designs were looming on the horizon. More perceptive thinking suggested that the growing R/C fraternity would have a continuous need for a trainer.

Hindsight suggests that the Champ was conceived at a time when R/C needs had finally stabilized, so it was based on proven principles that would probably never change. The right combination of design factors (unseen at the time) led to the much later advertising blurb "the trainer that today's experts learned with." Many modelers had done just that!

Some serious thought went into the



The author's Live Wire Champion brought R/C into being for thousands of modelers.

Citizen-Ship Tuned Relay receiver used four tubes.

Champ's design, beyond the original Live Wire concepts. The problems a beginner would encounter had been determined. The number one asset had to be good wind penetration. If it would also fly reliably by itself so that only directional control inputs were required, then no experience would be needed to keep it airborne. The size was gauged by economics and equipment weight. The .15 size engine would be suitable for all radios and would be inexpensive to purchase and operate. A modern feature for that day was the inclusion of elevators!

Another idea was scale appearance. R/C beginners had visions of models like B-17s, so if they had to start with a trainer it should at least fit their idea of what an airplane looked like. Adding a few specific lines and shapes to a basic model design easily created the scale appearance.

History is the best judge of how successful the concept was. Along the way there were Mk. II and III versions. The Mk. II simply had a stab raised to a scale-like position and a simplified wing structure, while the Mk. III had a change of R/C equipment installation to a more modern style. The Mk. I and II models were produced in many thousands by dmeco and the Mk. III is still in the Midwest Products line.

Tone and Pulse Systems

Last month I promised to continue with the tone system and to get into the multi-channel pulse systems, both of which competed with the initial reed systems for a while.

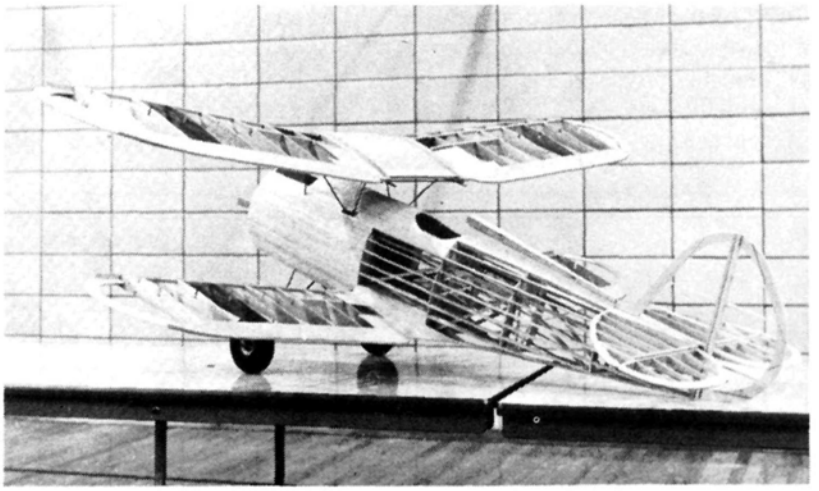
There was a strong desire to have a simple, lightweight, three-control system to provide rudder, elevator, and engine control. With the use of single-channel multi-servos and a reliable lightweight two-channel radio, this desire could be fulfilled. All that was needed was the radio and I knew of a concept which could be the answer.

A band pass tone filter included a heavy coil, which in operation keyed a relay. The concept envisioned double duty for the relay coil, operating the relay contacts and serving as the tone filter coil, thus eliminating the filter coil weight. This was a nice savings when several channels would be involved. They would be called "tuned relays."

At this time some reliable, lightweight, sub-miniature relays became available, making the concept very attractive. A two-tone transmitter was quickly produced, which consisted of a control box with push buttons for each channel. Then came bench time in developing reliable band pass circuits utilizing the relay coils. Persistence paid off with comparatively lightweight airborne components. About the only weight increase over a single channel was the additional servos.

I conducted some relatively smooth flight tests over several cool months. With a compound servo on rudder, activated by the right-hand control box button, rudder and engine control were available. The left-hand button operated a standard servo for elevator.

(Continued on page 68)



Early-day scale was successful as demonstrated by Douglas Mauer with his WACO F.

Gene Heydorn's early-day rendition of a Stinson Reliant had a 76-inch span.

CIRCUS CYCLONE

(Continued from page 54)

main shaft, re-check the pitch control rod for freedom of movement. Take your time and get a smooth, bind-free assembly.

The mainframe assembly looks very difficult, yet will probably amaze you with how well it works. I like the neat little hex-shaped pockets that are molded into the frame for the nylon insert nuts. You don't need a nut driver here! Don't forget the starting belt. Be sure to leave the non-shaded bolts loose as mentioned, as these bolts will be tightened later.

Step 19 is a little confusing; you're pulling up on the main shaft while tightening the upper plate lock. The 3 mm hole is the bolt hole in the main shaft for the rotor head, use this as the reference for adjusting the upper plate lock (90° from the top hole). Double-check the engine alignment, as this can be a source for extra wear and vibration if not performed correctly.

Part D of the front unit assembly can be installed backward (I did), resulting in servo mounting problems. Study the drawings carefully.

If you need to modify your throttle linkage, be sure to drill the hole in the mainframe and cooling shroud now, before attaching the servo trays.

Use thread-locking compound on all of the setscrews for the tail pulley and tail rotor hub. You might want to put the tail rotor blade grips on the hub before screwing it onto the output shaft, as this will help to prevent losing the screws. Use a drop of thread-lock on the tail rotor blade grip screws also. If you twist the tail drive belt in the wrong direction, your tail rotor will operate backward. Turning the rotor head clockwise will turn the tail rotors clockwise also. I used a 16-pound bowling ball in the bag and tied a rope around the tail boom and the ball bag as the weight for setting the correct belt tension. Be sure to check the belt tension before flying because the belt might stretch when new. It's a good idea to leave the tail rotor pitch control linkage a little long to accommodate the eventual lengthening of the tail boom from occasional belt retensioning.

Notice that the notches in the front bed are for rubber bands to hold the receiver and battery pack. Also notice that the landing gear has holders for the receiver antenna. Once again, your throttle linkage might need to be modified if you don't have a throttle lever extension. Follow these steps carefully and your setup should turn out to be very close, the only thing I might add is to center the trims on your transmitter and turn on your radio system to center the servo output arms before connecting them to the linkages.

Be sure to shave the ends of the rotor blades down as shown on page 26 of the assembly manual to prevent breaking the rotor head blade grips. Placing the rotor head on a vise with the flybar as a support would be a better way to check the blade balance. If you're an experienced helicopter modeler, use your own favorite balance method.

The ABS plastic cabin material will take just about any type of paint if you wish to change the color. You should relieve the cabin around the cabin frame where the lower screws will attach it to the mainframe before gluing the cabin together.

Be sure that you follow *all* of the recommended steps regarding pre-flight adjustment. Pay particular attention to the

(Continued on page 64)

CIRCUS CYCLONE

(Continued from page 62)

gyro direction as this condition can make the helicopter act as if there is a tail rotor failure.

My Cyclone is equipped with Webra's new Speed .52 helicopter engine, Mac's Heloball muffler, JR's new Galaxy Computer 8 radio system with 4001 servos, and the JR110 pro-gyrosensor. The Webra Speed .52 is a new engine designed around the famous Speed .40. It features Schnuerle porting, double ball bearings, and a Dykes ring. These features add up to a very dependable, powerful engine which is just right for the Cyclone. The new Galaxy Computer 8 radio system was quite a luxury for this project, and really was not necessary, however using a system this advanced in any helicopter can certainly spoil you. The Galaxy can be set to handle up to seven different models with the same transmitter, and has features that are unique. An example of this is the new throttle curve, and pitch curve features which work together to provide true rotor speed control for all flight attitudes. This radio system is so well engineered, you might wonder what could be next?

Optional equipment available for the Cyclone includes an autorotation clutch, weighted rotor blades, and tail boom support. Also available is a spare parts kit which includes most of the parts which are likely to be damaged in a minor crash. This is a great idea and is well worth the investment. Not much else is required to turn the Cyclone into a truly all-purpose sport machine. I've left my Cyclone in the stock configuration for this review, and have several hours of flight on it with no failures and only minor maintenance needed to date.

FLYING. Flying the Cyclone is where the best of this design really stands out. Kalt has managed to tame the beast without sacrificing aerobatic capability. In other words, the Cyclone is gentle and stable, yet very maneuverable. What is even more amazing is that all of this is accomplished without changing anything in the setup of the helicopter. This means that an accomplished flier can take the Cyclone, perform aerobatics, such as rolls and loops, and then hand it over to any beginner with confidence that the machine will be right for him also.

In summary, I feel that the Cyclone fills the need for an all-around helicopter that will take the pilot from first steps all the way to expert without the need for expensive, complicated machines. It might not

(Continued on page 68)

FOCKE-WULF

From the Cockpit

photo courtesy of the
SMITHSONIAN INSTITUTION

by BUDD DAVISSON

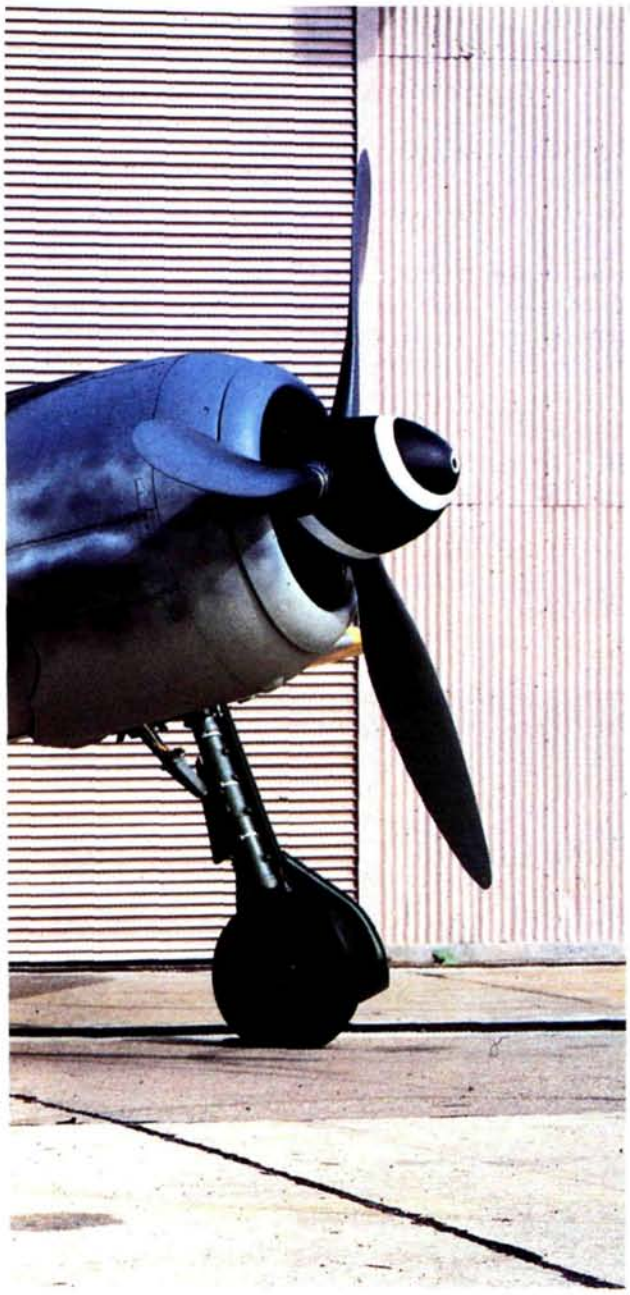
WHEN THE QUARTET of dark round-engined demons fell out of the sky on the unsuspecting flight of Spitfire Vs, the RAF pilots later reported to intelligence that they didn't know what kind of airplanes they were, but they certainly were not Me-109s. There were flaming Spitfires curling toward the sea before they could even begin to use the Spit's lengendary ability to turn. This new Luftwaffe machine could clearly outperform them in almost every way.

The airplane was the Focke-Wulf Fw-190A-1 and it was to Nazi Germany what the Mustang was to America. She represented new concepts both in philosophy and mechanics, and was continually modified throughout the war to perform every duty short of dishwashing.

Like the Mustang, she was born to perform a slightly different purpose than those

FW190

THE LUFTWAFFE'S NOTORIOUS BIRD OF PREY!



fighters that had gone before. Specifically, the German high command realized very quickly that the Me-109 had some very real drawbacks, and that Britain and the U.S. hadn't been sitting on their sliderules while Germany forged a new air arm. While the Me-109 was a good airplane in the hands of a professional pilot, it was such a handful on takeoff and landing that the operational losses were appalling. Changes had to be made because the new Luftwaffe included thousands of newly-trained schoolboys and college students who couldn't be counted upon to keep the cantankerous 109 straight on takeoff and landing. America had faced the same problem and the wide landing gear on the Mustang was in direct response to the spindly stance of the P-40.

The year was 1938 when the call went out to German industry asking for new fighter designs. Although Germany was involved in the same dog-fighter versus speed and range controversy that was being heard worldwide, they gave the nod toward speed and range. Again, definite parallels can be drawn with American design thinking. The final design was Focke-Wulf's 190, which was surprising if only because it utilized a radial engine in direct contradiction to historical Luftwaffe thinking. The sleek lines possible with in-line, water-cooled

...modified to perform every duty short of dishwashing.

engines were then thought to be the only way toward speed and performance, but they hadn't reckoned with Focke-Wulf's chief engineer Kurt Tank.

Apparently Tank's ability as an engineer was matched by his abilities to persuade those above him that there were better technical solutions to the problems of war. He showed how the greater horsepower and availability of the BMW radial would overcome any shortcomings occasioned by its blunt nose.

And so the Fw-190 leapt out of Kurt Tank's mind onto the drawing boards of his project engineers, who made it into an aluminum and steel reality.

The initial experimental versions of the Fw-190 had huge propeller spinners which were the same diameter as the cowling in an effort to streamline the radial engine. However, obvious cooling problems arose which were never fully solved, even though a small, multi-blade fan was attached to the crankshaft behind the propeller as a blower to force-cool the engine. The large spinner was dropped in favor of a more conventional arrangement, but the 12-blade cooling fan became a fixture of the round-engine Focke-Wulfs.

As initially designed and produced in prototype form, the Fw-190 was a truly amazing machine. Weighing only 6,100 pounds loaded with nearly 1,600 horsepower, it had a power-to-weight ratio of under 4 pounds per horsepower and a wing loading of nearly 38 pounds. By comparison, the P-51 had nearly 6 pounds for each horse. The ability of the Fw-190 prototypes to climb wasn't eclipsed until the FF Bearcat came on line. The Fw-190A's performance was so great when matched against the Spitfire V, it could break off the fight and run any time it wanted. Although its high wing loading wouldn't let it turn with the Spit, that was of little consolation to RAF pilots who would find themselves pulling lead on a 190, only to have it half roll

(Continued on page 72)

CIRCUS CYCLONE

(Continued from page 64)

be the only helicopter you'll own, but for the most part it's the only one you need.

**The following is the address of the company mentioned in this article:*

Circus Hobbies, 3132 S. Highland Dr., Las Vegas, NV 89109. ■

GOLDEN AGE

(Continued from page 61)

About this time the weather turned hot and I had a visit from Bill Winter. Of course I had to show off my new rig. An early morning flight went fine, but on a much later second attempt I couldn't get a pre-flight control check and spent the rest of the hot day fiddling with it. Back home, in the cool of the evening, Bill suggested we try again. It worked like a charm! Thus we learned about component drift with heat. Changing some diodes from germanium to silicone solved the problem.

I passed the radio design on to the Citizen-Ship Corporation, and they eventually marketed it as the C-S Dual Channel system. With the rapid advancements that were coming, however, its advantages were short-lived.

Advocates of the pulse system made extensive multi-channel efforts. Out of it all, the ultimate became Walt Good's TTPW system, which provided proportional rudder and elevator, plus engine control. TTPW was the abbreviation for Two Tone Pulse Width. For those who didn't comprehend, it was quickly translated to "too tough to piddle with." It was also a well developed, impressive example of pulse coding.

Basically, this was a two-channel system which used a single audio tone and was coded to operate two pulse-style motor actuators. The third engine function was obtained in single-channel fashion by cutting off the tone completely, allowing an escapement to step to another position.

The tone coding was a combination of pulse width and pulse rate, or frequency. The pulse width feature operated the elevator and the pulse rate portion handled the rudder. The transmitter modulated the tone from a wide to a

(Continued on page 71)

SUPER SPORTSTERS

Proven Performance & PIZAZZ!

Did your last trip to the flying field seem like just another day at the office? Put some **Pizazz** into your life with one of these Great Planes Sportsters. You'll actually feel like putting on a flying jacket and goggles when you fire up your Sportster because every flight will be an aerobatic creation all your own!

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A Sportster will do what you want it to . . . and nothing more! It has "predictable agility", with no surprises.

Whether you prefer 2 or 4-cycle, tricycle or taildragger, mono or biplane, the Sportsters are versatile enough to let you create your very own classy "hotdogger". The detailed plans and photo-illustrated instructions guide you smoothly through the snag-free construction process, using precision-machined parts that always fit right – just as you expect from Great Planes ki

Whether you are a novice ready to move into a low wing ship with a lot more aerobatic capability, or a seasoned veteran lookin for a more relaxing fun-fly machine, choose a Sportster for your next airplane. It'll add **Pizazz** to your life!

Super Sportster 60
Wingspan: 61"
Radio: 4-Channel
Engine: 2-Cycle .45 -.61
4-Cycle .60 -.90

Super Bipe 40
Wingspan: 45"
Radio: 4-Channel
Engine: 2-Cycle .35 -.45
4-Cycle .60

Super Sportster 40
Wingspan: 56"
Radio: 4-Channel
Engine: 2-Cycle .35 -.45
4-Cycle .40 -.60

Super Sportster 20
Wingspan: 48"
Radio: 4-Channel
Engine: 2-Cycle .19 -.25
4-Cycle .30

GREAT PLANES
MODEL MANUFACTURING COMPANY

GOLDEN AGE

(Continued from page 68)

narrow burst and the control box pulsed the bursts on and off, each as long as commanded. As with the popular single-channel pulse method, the on-to-off time difference determined which relay contact remained closed longer, and, in turn, which direction the elevator moved.

The pulse rate rudder channel feature established how *often* the two bursts of tone were transmitted, so in effect the transmitter had a modulator to create the two different width bursts, plus a generator which established how often the two bursts would be transmitted. For rudder, the control box pulsed between a fast and a slow rate of tone burst transmission and the rudder responded in a typical pulse fashion.

Obviously the receiver had a precise decoding circuit to interpret the coding and to direct the various relays to operate as commanded.

With all the pulsing being done at a 4-cps rate, there was very little visual flutter in the control surfaces. Inspection by the uninitiated often brought the comment that they "looked alive," however a casual observation of the control action would actually appear similar to our modern systems.

The TTPW also had a fail-safe feature, a side effect that allowed engine control. The receiver circuit included a third double throw relay which remained "open" when the proper audio tone was present. The actuator power supply was routed through this normally open relay contact. If the signal tone was disrupted, this relay energized, switching the actuator power from the coding section to direct, and the actuators neutralized. This action also interrupted the engine escapement power, causing it to step a position. For engine control there was a button switch which would cut off the carrier and tone. A quick blip of this switch would operate the engine escapement with little noticeable effect on the primary controls.

Dr. Good leaned on some of the well developed pulse systems, and adapted them to his ingenious concept, resulting in multi-controls. This gave him a usable system with some reliability, plus it provided proportional action. It was also a complex system that stretched to a limit what could be done with basic pulse concepts. Unfortunately, the desire for "full house" controls increased the complexity further, which made other concepts more attractive.

(Continued on page 84)

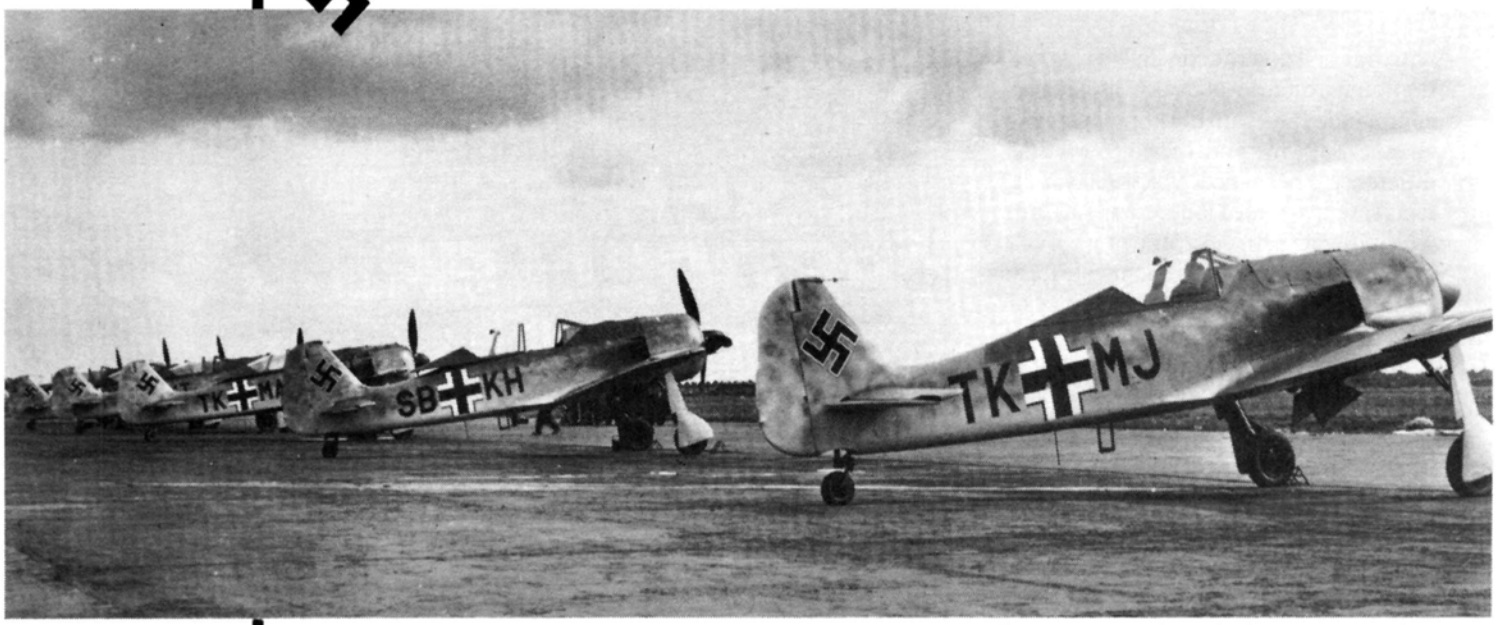


Photo courtesy of the Smithsonian Institution.

(Continued from page 67)

and dive out of sight or pound the throttle through the stop and disappear in the distance.

But the Fw-190 was not without tremendous teething problems, most of which lay ahead of the firewall. The original BMW 139 was never installed operationally and, in fact, nearly the entire first series of Fw-190A-1s was continually modified until the Fw-190A-2 became the standard operational airplane equipped with the BMW 801 of 1,550 horses. Naturally, as with all fighter aircraft, the modifications caused her to become swollen and overweight, and her performance degraded tremendously. In subsequent models, this problem was attacked with slightly larger wings and a horsepower increase, and the performance returned.

As a fighter, she was a thoroughbred from the very beginning, although her powerplants did restrict her combat arena to the band between 16,000 feet and 24,000 feet. Above that she ran out of horses and below, began to have other problems. All of these were solved in typical German fashion...quickly and accurately.

It became obvious to the Germans early in the war that an airplane that couldn't mix it up with bombers effectively in the area of 35,000 feet was an airplane that couldn't be counted upon to protect Germany's industrial heart. They desperately needed a high-altitude fighter. The BMW just couldn't deliver the power they needed at altitude and they thought the pilot needed a pressurized cockpit at that altitude.

The Fw-190A was modified into two different variants to produce machines that were capable at both high and low altitudes. The wing was increased 11 percent in area and the cabin pressurized via bleed air off the turbo chargers. This variation was the 190B. The C model used the Daimler Benz DB 603 water-cooled in-line engine, but the airframe didn't have the altitude modifications since it was slated to work at the lower levels expected of a fighter bomber. Both variants were short-lived since they were rapidly replaced by the superlative Fw-190D-9.

The D-9 version became

Photo courtesy of the Smithsonian Institution.

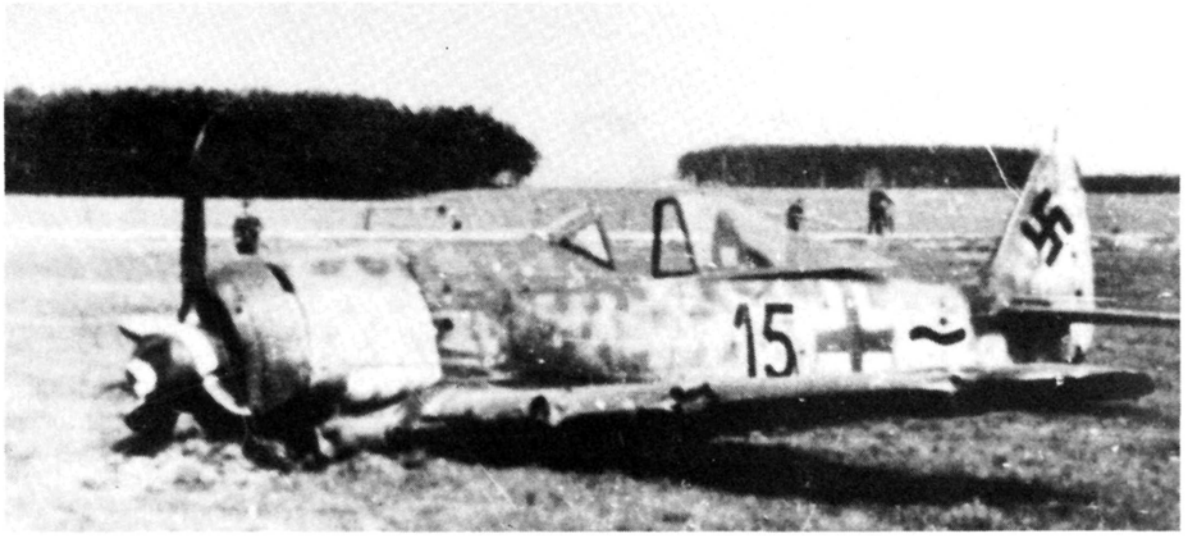


Photo courtesy of the Smithsonian Institution.

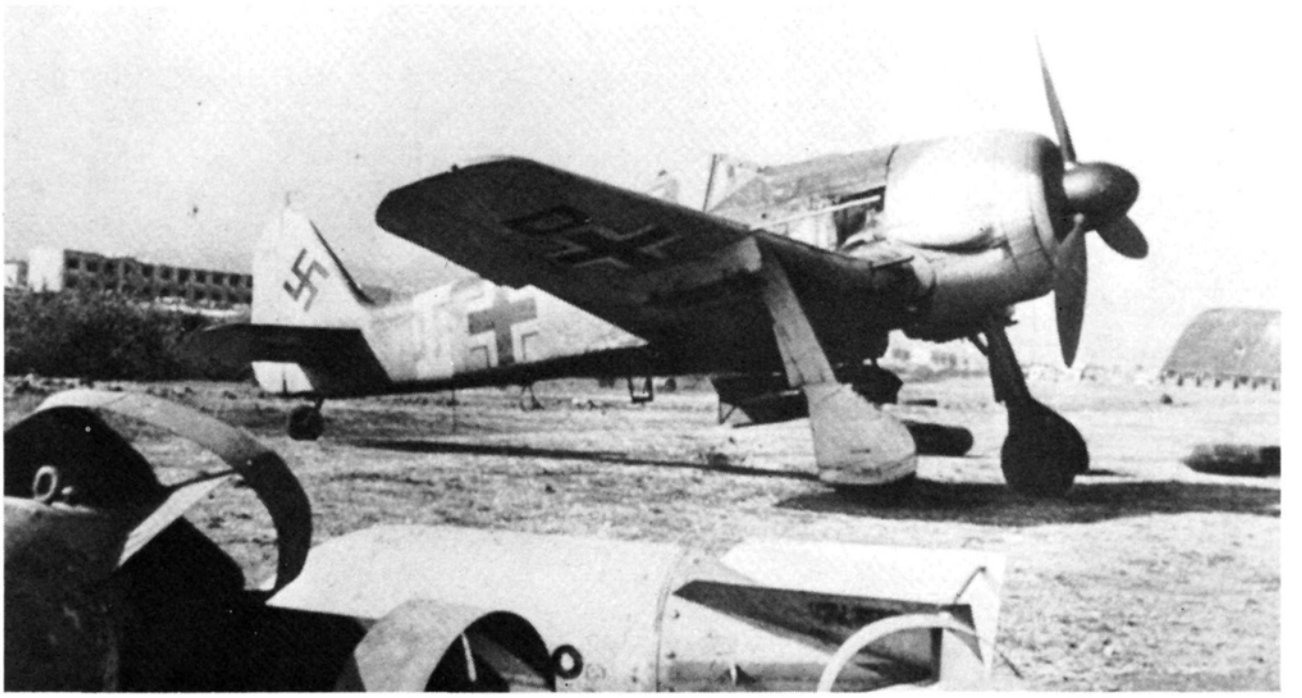
known to friends and foes alike as the Long-Nosed D, although those on the other side of the Rhine pronounced it *Langnasen Dora 9.* The airplane utilized the larger wing of the B model and received a nearly 2 foot extension of the fuselage to offset the increased length of the Jumo 213 1,776-horsepower in-line engine. With water methanol injection, this engine could deliver 2,240 horsepower for 60 seconds. The Dora 9 proved to be a match for the much-vaunted Mustang in almost all areas. The D-9 solved the radiator-mounting problem differently than the Mustang, however. It was installed directly behind the propeller in an annular arrangement with the crankshaft sticking through it.

The armament of the Fw-190 series normally included two 7.9-mm (approximately .30-caliber) machine guns in the cowling and a 20-mm cannon in each wing root. Most later variations included two additional 20-mm cannons in the outboard wing panels and a few variations carried as many as six(!) 20-mm cannons, making it probably the most heavily armed fighter of the war.

The incredible utility of the 190 could be attested to by the many sub-variants that included special weapons packages aimed at solving special problems. She could carry bombs in many different configurations and indeed was equipped to replace the Ju-87 Stuka in the dive bomber role. As tank buster she sometimes carried 20-mm gun packs under the wings and often mounted 37-mm cannons, as well as many types of rockets designed to punch holes in Russian T-34 tanks.

When the first large B-17 flights began delivering

(Continued on page 120)



M.A.N. file photo.

Radio Control News

by ART SCHROEDER

WE NEED A new course of action and we need it desperately! As I see it, R/C flying as a viable hobby/sport is in danger of extinction. Flying fields are becoming very scarce in the east—in other regions as well.

I started to fly radio-controlled airplanes in 1950. Over the 36 years of that involvement I've been (along with many others) thrown off at least one flying site a year. Often the field was public property supported by local, state, or federal funds, a three-pronged statement that means *our* taxes!

The reasons for an end to R/C activity have ranged from noise to property development to perceptions of R/C's dangers to unauthorized use. A few of the complaints were valid—most were not. But always, the R/Cers involved quietly picked up their transmitters and airplanes and moved on to the next area they could find.

Always the next open area quickly posed problems for fliers. Usually it was noise; even to today with mufflers, tuned pipes, and four-cycle engines. Even electrics and gliders have not been immune from the old "heave-ho"! It matters not that R/Cing has, in many instances (particularly in the urbanized east) reached levels of noise well below ambient. We remain unwelcome.

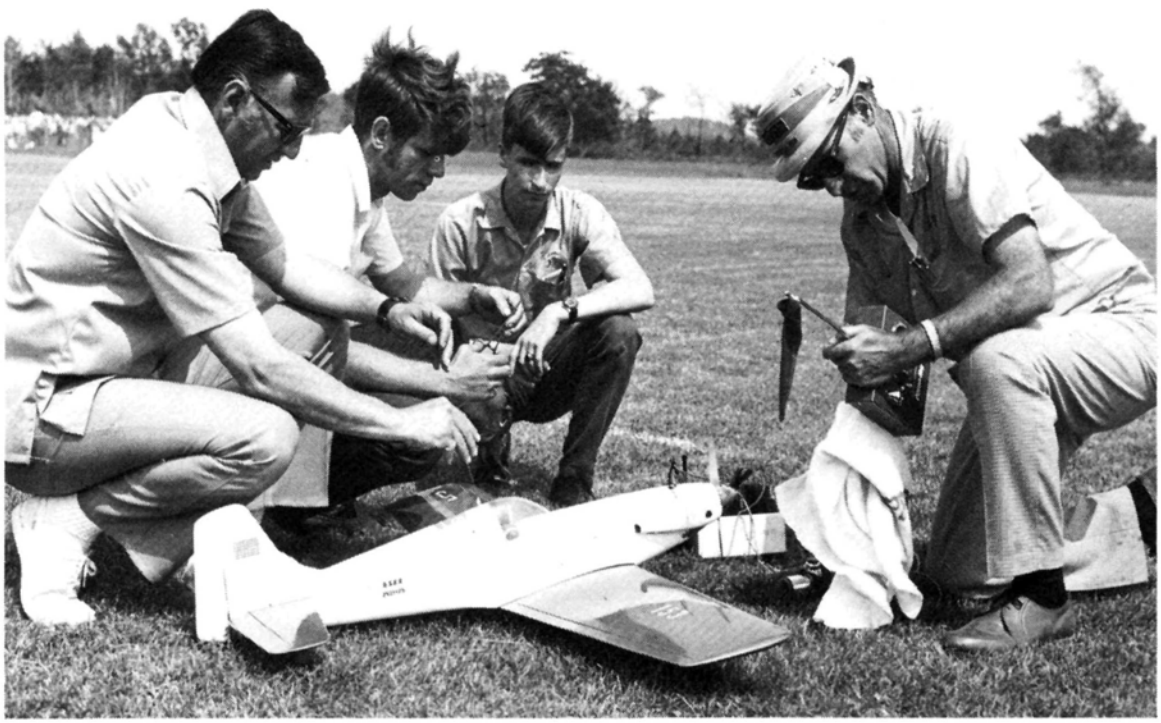
I know of a public area closed to gliders (indeed, I was invited to leave the area while flying a rubber-powered airplane). The reason—danger and insurance liability. No noise, just some bureaucrat's idea of a dangerous activity.

There is a nearby park that bans *any* model airplane flying as well as the operation of R/C electric boats in the park pond. The reason for the latter was a group of upset swans. I kid you not; it made no difference that the swans were removed soon after *for their frequent attacks on people!* No matter, R/C boats are still not allowed. That public park has open areas suitable for some forms of R/C flying. But those areas (often unused) are dedicated to baseball, softball, soccer, and football, and are supported by public funds. R/Cers (along with U-Controllers or Free Flighters) must stay away—even though they pay part of the tab.

I live, and pay taxes, in an eastern state county that has publicly-supported golf courses, swimming pools, ice rinks, parks, green acres areas—even areas preserved for wildlife. Nearby there is a professional sports complex built and operated with public funds and public bonding authority. There is a proposed velodrome for cyclists and numerous other publicly-supported recreational activities. I do not need or desire the things that are supported, but I don't mind so long as I, and my compatriots, can have a small share of the "pie."

Often our flying activities take place on

(Continued on page 76)



Radio-control flying and modeling in general could be on the verge of extinction due to noise complaints, zoning ordinances, and other such public rationale. See text for more details.

R/C NEWS

(Continued from page 74)

private land. And our last dismissal involved that type of land. It was a flying field on a piece of land that had little real commercial value—it was swamp land; meadowlands we call it in this area. It was a piece of land on the edge of an industrial park where no sensitive ears could be annoyed by our flying activities. Flying there was at the kindness of a developer who had no immediate plans for the area. The field existed for years with no serious problems of any kind.

Unfortunately, the area was near an airport—nowhere near that airport's land-

Author Art Schroeder is a strong advocate of publically-supported activities, which seems to exclude modeling.

ing patterns, but nearby to be sure. Okay, a 400-foot limitation on R/C flying should be sufficient (and legal) to avoid any problem—and as I said it did for years. Not so anymore!

Various full-scale pilots frequently would be below their mandatory minimums and, most importantly, some full-scale helicopter pilots flew wherever they damn well pleased; 400 feet or not. Result: *get rid of the R/C fliers.* We were gone and it has been the most unfair dismissal I've ever witnessed in 36 years. And even more annoying—our dismissal was commanded by the publically-supported FAA! I pay federal taxes as well and I'm being cut off from my favored activity because full-scale pilots are not following the rules. I understand the FAA's role in the area of air safety, but somehow the innocent party is punished and the guilty win! Because I pay federal taxes, I'm also supporting that airport. Frankly, I'm tired of paying taxes for so many things I don't want without one bit of return for what I do want.

Some will say that it is model aviation's lack of a solid junior program that is our problem. That may be so, but the athletic fields I speak of are populated by middle-aged "jocks" most of the time—the pile of six-packs near home plate testifies to that. And that airport is not there for kids, it is

(Continued on page 127)

Floating Around

by JOHN SULLIVAN

THIS MONTH I'D like to recommend a couple of books to anyone even remotely interested in float flying: *How to Fly Floats* by Jay Frey ($3), and *Flying a Floatplane* by Marin Faure ($16). Both publications are available from Zenith Aviation* and you'll find their ad right here in *M.A.N.*, or you can contact them for ordering information at the address listed at the end of this article.

How to Fly Floats is a 60-page booklet from the Edo Float Corporation in College Point, New York. It covers every aspect of full-scale float flying, from preflighting to getting a rating. It's concise, well-illustrated with drawings and photos, and the perfect choice for someone who wants to get at the "hows" and "whys" of float flying quickly.

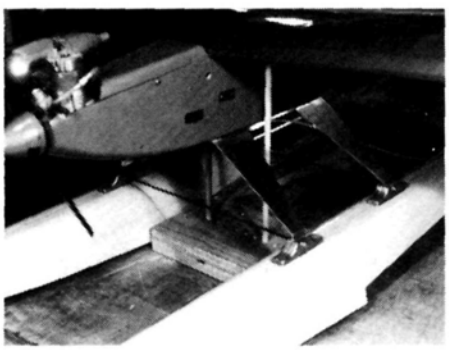
The front cover of *Flying a Floatplane* is a magnificent color shot of a yellow and white deHavilland Beaver starting its takeoff run at Princess Louisa Inlet on the Southwest coast of British Columbia. Inside, there are 250 pages of everything you could want to know about floatplanes. The author, Marin Faure, is an excellent writer and his love for floatplanes is evident in every paragraph. There are over 100 photos of floatplanes. How about a Beechcraft Staggerwing on floats, Lincoln Ellsworth's Northrop Gamma, the Noorduyn Norseman, the Macchi-Castoldi MC-72, or the world's first seaplane, Henry Fabre's Hydravion? There're all in there and I guarantee that you won't be disappointed.

Flying floatplanes is a bit different from flying landplanes, but it's a lot of fun. Approach speed must be kept higher and airplane must be flown to point of contact with the water.

Goldberg Falcon

It's pretty hard to be involved in modeling very long without being exposed to Carl Goldberg's* Falcon. Its flying abilities are legendary. As Fred Constantine put it, "After owning one, the only reason you buy another plane is because you want something that *looks* different."

This month we're going to take a close look at adapting a Senior Falcon to floats. The first thing you need to do is go shopping, so here's the list:



Dowel rods propped under wing of Goldberg Senior Falcon to check balance.

Float Gear

Two Great Planes* 14-inch aluminum gear blanks

Four ¾-inch square by 3-inch long hardwood blocks

One 36-inch length 5/32-inch music wire (spreaders)

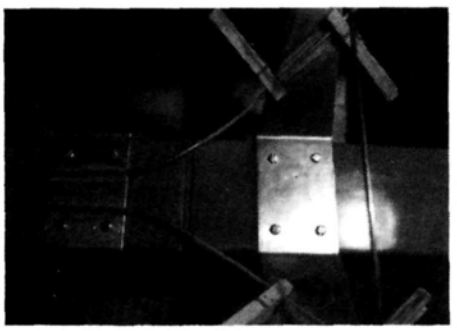
Eight 5/32-inch wheel collars (spreader stays)

Epoxy putty-filler and fuselage bottom contour putty

Components blocked up for final assembly. Accurate alignment is essential for proper operation.

Floats

One pair 38-inch foam floats with redwood strongback
1/32-inch (top) and 1/16-inch (bottom) balsa sheet
1/8-inch plywood scrap (step and stern sheeting)
Sig* Foam Bond or equal



Sullivan braided cable used for controlling steering of floats.

3/4-ounce glass cloth
Polyester finishing resin
Coverite* Black Baron epoxy paint or equal

Control Mechanics

Sheet metal scrap (rudders and nose tiller bar)
5/32-inch music wire (nose tiller rod)
3/32-inch music wire (rudder posts)
3/32-inch i.d. brass tube (rudder post sleeve)
Two Goldberg medium nosewheel mounts with tillers
Two Sullivan gold braided control cables
Aluminum tubing (sized to sleeve Sullivan cables)
Two Goldberg EZ connectors
Two Goldberg nylon clevises

The above list will be augmented with standard building materials you should already have: cyanoacrylate glue, blades, scrap balsa, and the like. For the sake of brevity, I'm going to list the conversion process by steps with somewhat cryptic notes where necessary.

1. Dismantle the radio bay which provides access to the fuselage floor. Check equipment and waterproof the radio bay.

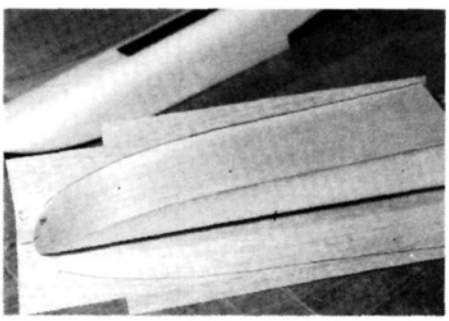
2. Preliminary layout; clamp and block unfinished components in place (step at CG, prop clears float deck by 1 inch) and mark attachment points.

3. Install gear hardpoints; 1/8-inch birch ply doublers and glue blocks at fuselage sides are sufficient.

4. Drill gear; 5/32-inch hole at feet for spreader and four 1/8-inch holes at midsection, 1/2x5 sheet metal screws for fuselage attachment.

5. Clamp align gear and mount; provide epoxy shim at fuselage bottom to match fuselage contour.

6. Fabricate feet; 1/8-inch slot in 3/4-inch hardwood.



Floats being sheeted. Note redwood strongback in top of float at rear.

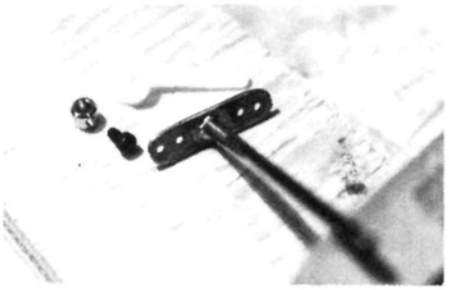
7. Install feet and 5/32-inch spreader bars; spreader trapped with wheel collars. Fill slots with epoxy putty.

8. Fabricate and install nosewheel tiller; sheet metal arm soldered to appropriate music wire rod.

9. Reassemble radio bay; also plug land gear fuselage holes with candle wax.

This completes the fuselage modifications. Hereafter, conversion back to land gear only requires the removal of eight sheet metal screws and the exchange of nose gear. Now, on to the floats.

10. Assemble balsa sheeting; 1/32-inch top and 1/16-inch bottom. Join seams with masking tape.



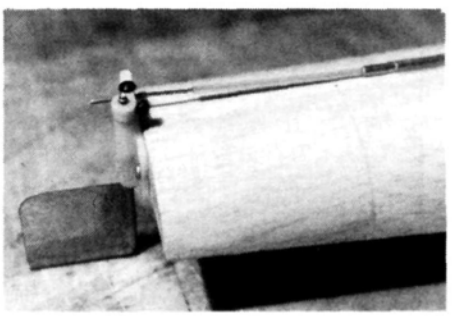
Nose tiller assembly. Drill holes for nylon clevis.

11. Install redwood strongbacks and plywood step and transom plates. Use Elmers Glue or epoxy.

12. Apply sheeting and trim; Sig Foam Bond works well, also 3M Super 77 (hard to find).

13. Glass and paint floats; 3/4-ounce cloth is sufficient, epoxy paint most durable. Mark float centerlines.

14. Fabricate rudder assemblies; 3/32-inch i.d. brass sleeve in Goldberg medium nosewheel mount. Epoxy putty voids and redrill. Sheet metal rudders soldered to 3/32-inch music wire.



Closeup of rudder-coupled steering assembly.

15. Mount rudder assemblies; use two 3/8x4 sheet metal screws with RC56 or silicone in holes. Mount plumb.

16. Mount floats to fuselage; align accurately. Floats and fuselage must be

(Continued on page 118)

GOLDEN AGE

(Continued from page 71)

Dr. Good was not alone with his efforts. Other modelers collaborated with him and some had success by expanding on the basic concept. But, once again, this was a time of rapid advancements and more practical ways quickly took over. Think of the reed systems. Another channel was had by simply adding another reed and its associated relay!

At this point you can see how the knowledge required to create our modern systems was evolving. With the desirable characteristics of the tone systems, a usable information carrier was established. The TTPW system proved that such a tone could be "coded" to reliably provide multi channels of information, and thus controls. Today's systems are no more than these basics, to which a digital method of coding has been added. But, before this could happen, we had to travel the "reed route," which is another story.

News From You

I'll close this month with some input from you readers. A letter from Joe Nehring of Hilo, Hawaii, is typical of many. What made Joe's information attractive is that he is interested in OT R/C and has begun an OT model project. Those who are already flying or who are building are the heart of the OT R/C movement. Why not join it? It's growing.

Mostly we think of OT R/C models and modeling as being similar to free flight, but my correspondence indicates that some of the early birds would neatly fit today's scale scene. A letter from Gene Heydorn of Munds Park, Arizona, tells that he is again enjoying OT R/C activity. Most interesting are photos of his early Stinson Reliant, P-47, and even a C-47. The Stinson is especially outstanding as it was true scale, even duplicating the internal structure exactly as it was in the full-scale. Best of all, it flew successfully with a Citizen-Ship single-channel and compound escapements, showing that R/C was not top dog in those days. His models were built to fly in three ways—R/C, free flight, and control line!

Speaking of the Stinson Reliant, I recall a couple of popular early kits. You

(Continued on page 88)

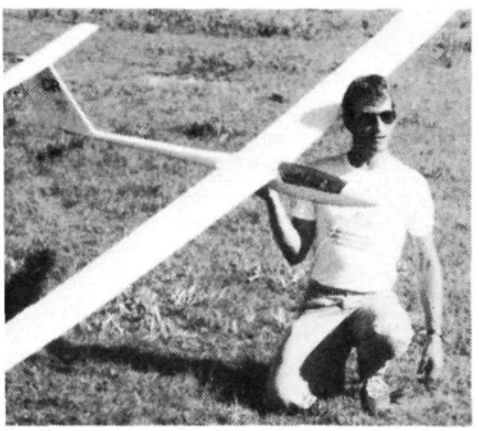
Soaring News

by JIM GRAY

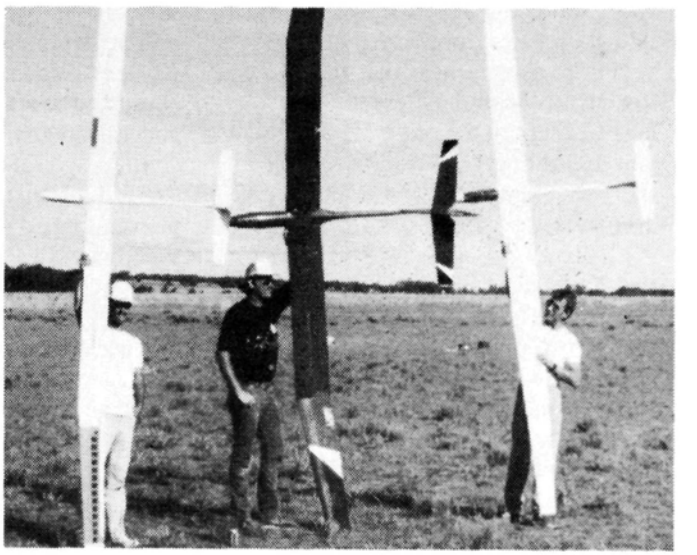
AS I MENTIONED last month we columnists thrive on your input. This month I have new products and announcements from you readers.

The first product is an oil called Slip-it and it's available from Micro Research*. It can be used for lubricating bearings, hinges, ball joints, linkages, gears, servos, control cables inside those plastic "snakes," and many other things. Slip-it is applied to the desired area which it penetrates and bonds to, leaving an invisible, durable, and super slick surface. I've used it for all these applications and more, and it works just fine. Slip-it costs $5.95 for a bottle that ought to last for a year in normal use and application. The company has a contest going until September 1, based on the most unusual and original application for their product. The winner will be awarded a Hirobo GMP Shuttle helicopter!

Slip-it is hot-fuel proof, but it's not recommended for surfaces that will be painted later, as paint will not adhere to them if this lubricant is spilled on them. It's also not to be used on electric motor brushes and commutators, and it's not a good fuel additive. So, jump on over to your hobby store, pick up a card with a bottle of Slip-it, and enter the contest.



Second-place winner Charles Rudnick used high aspect ratio sailplane with ailerons, winglets, and a T-tail configuration.



The three top placers in the world's first F3H contest were, left to right, Frikkie Roos, Larry Jolly, and Charles Rudnick. All models are over 12-foot span.

Besides being a potential winner, you're going to be a satisfied user. The only slight problem I've had with it is that if I'm not extremely careful, more of the lubricant comes out of the bottle than I want to use at the moment, and covers unwanted areas. This is no major thing, but it's so slippery after drying that you'll find the covered areas too slippery to handle unless you carefully clean off the dried film with a solvent! I've not yet tried it on a winch drum bearing, but I feet that it would be very good in that application.

You may recall that a few months ago, Martin Simons was still engaged in legal action pertaining to publication of his massive new book about sailplanes. Fortunately, this has been settled amicably, and Kookaburra Technical Publications* has now announced the availability of their new book entitled *The World's Vintage Sailplanes 1908-45*. A special offer is being made by the publisher to readers who send two International Reply Coupons (available from your local Post Office) to the company. In return, they will mail you a free color brochure describing the book in detail, price information, and ordering instructions. For all you scale fanatics, send right now for the information and beat the rest of the world to the punch. I can't wait to receive my copy!

I've been testing the Nor-Ray Products* foam cutter called the "Hands Off Cut II" and it's a real gem. So far, my OFB and I have managed to cut out several sets of perfectly-shaped wings, a bunch of stabs and fins, plus a lot of other things, and they've all turned out great. The Hands Off Cut II comes as a simple kit to be attached to your own ½-inch plywood base. The instructions make it possible to have yours assembled and ready to go within an hour. If you have your own DC power source, fine, otherwise you can buy one from Nor-Ray for just a bit of money.

One of the features you'll like is that *both* wing surfaces are cut at the same time! Yep, two wires work simultaneously. Another smart design feature is that the foam is pulled through the wires rather than the other way around. Weights do the work while you adjust the current for best cut. Although we haven't had the courage (or reason) to cut fuselages from foam blocks with this cutter, Ray says that it can be done and I believe him. He hasn't steered us wrong yet. For about $90 you'll get a machine (with spares and extras) that will give you a lifetime of foam cutting.

The black and white photos presented here are from my friend John Lightfoot who sends information about some of the fliers and sailplanes entered in the South African cross-country (F3H) race held in December 1985. Unfortunately, the article that accompanied the pictures is too long to present in these pages, but I hope you'll enjoy the photos.

More on Aerotowing from Ray Stark

Last month we presented a letter from Ray Stark on aerotowing. Here's a follow-up letter from Ray:

"I'm pleased to hear that the info on towing was helpful. After receiving your letter, I dug out the original letter I sent you and thought I'd elaborate a bit on the two points you found interesting, Jim.

"1. Towing With Low Power. While the .20-powered Eaglet was successful in the proof of concept, I wouldn't propose that a club build their tow ship around a .20. The key is the ability to fly slowly and climb fairly rapidly so as to minimize time on the line. That's why the Super Cub is such a popular tow ship for full-size sailplanes. It's a kite built around a fairly powerful motor. In actual tows on Long Island, the Cub was ready to go get another glider by the time it had climbed through a 360° turn (box pattern with 1-mile legs). The tow ship for R/C should be no different (except in scale) and one large circuit around the field should place the sailplane at more than adequate altitude. A .20-size ship is taxed to the limit on a warm day. The Eaglet is a wonderful size as it fits in the back of my Camaro without disassembly. Mine has an HB 25 mounted in the nose and uses oversize full trailing edge flaps with spoilers for roll. While not built specifically for aerotowing, the added power is a move in the right direction. I really feel the perfect ship would be an Eagle 63 with an O.S. 28 Schnuerle in the nose. Maybe even a 10-inch wing extension and a flap/spoiler setup like my aging Eaglet (which, by the way, has logged *over 1,500 touch-and-go's* since its construction ½ years ago, without incident!)

"2. Rubber Bands In The Towline. Full-size ships gain quite a bit of stretch out of the nylon line used. The tow ship is rolling before the sailplane ever begins to move. With R/C towing it's even more important to have that cushion effect present, because you can't fly exactly behind the tow plane. Remember: the sailplane is operating at a speed not unlike that found on a hi-start or winch. Control response is almost instantaneous, and it's easy to overcontrol the glider. *(Hmmm, I wonder why dual-rate controls wouldn't be a big help here—JHG)* I haven't been able to get maneuverability out of my Gentle Lady like that behind Bert's Eaglet without resorting to steep dives. I wonder if the prop blast might increase effectiveness? Anyway, some means of cushioning the errant wanderings of the sailplane is essential. We found ourselves in trouble the first time we tried to tow without the rubber bands. We blew up the last rubber band we had that day, so we tried one tow without—that's how I snatched all Bert's airspeed and ultimately ended our experiment for the day in the tall grass. We found for our application that four #64-size bands in series worked okay. Larger ships might require doubling of the bands. An alternative might be the setup pictured. It would provide cushioning but wouldn't break under the severest of tugs. However, I prefer the thought of broken bands as opposed to broken airplanes.

"Well, I'll quit. It's a fascinating project, and—as I mentioned in my last letter—it's doing odd things with the cheapest of materials that gives the greatest rewards in this hobby. Be it towing streamers with gliders or hi-starting a Gentle Lady and an Aquila Grande off the same hi-start at the same time, as long as the mind of the modeler is free to wonder and wander, there will exist no end to this wonderful hobby."

Larry Jolly's Comet is a winning combination with a wide chord polyhedral, rudder/elevator setup. Kit is available from Jolly.

Ray, I thank you for taking the time to share your experiences. They will be vital in assisting others to get out there and experiment—improving where possible the fundamentals you've laid down. If we get some more feedback, I'll pass it along right here.

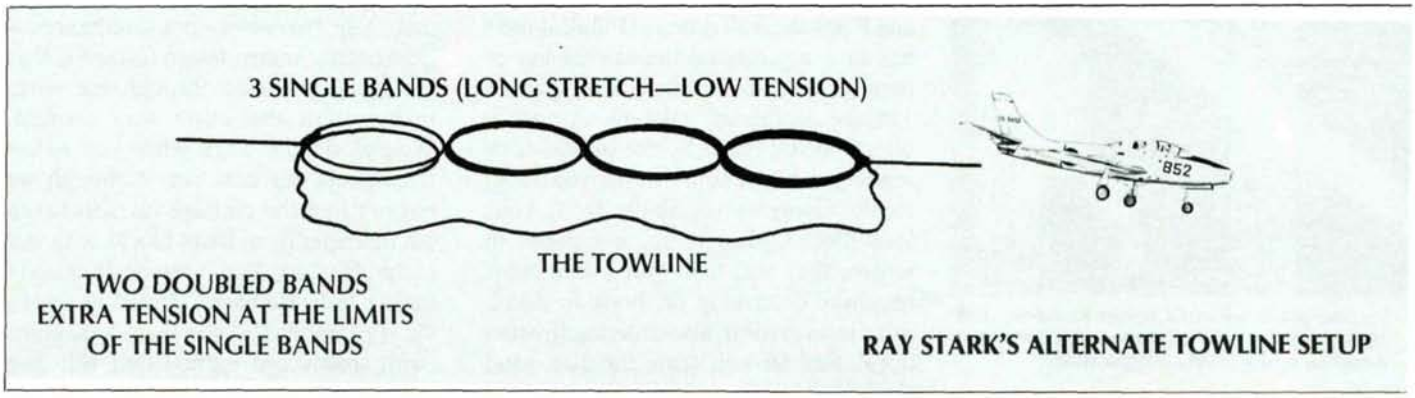
Jim Gray, c/o *Model Airplane News*, 632 Danbury Rd., Wilton, CT 06897.

**The following are the addresses of the companies mentioned in this article:*

Micro Research, P.O. Box 2777, Danbury, CT 06813.

Geoffrey Pentland, c/o Kookaburra Technical Publications Pty. Ltd., P.O. Box 648, Dandenong 3175, Victoria, Australia.

Nor-Ray Products, Inc., 5008 Sand Beach Rd., Wichita Falls, TX 76310. ■



RAY STARK'S ALTERNATE TOWLINE SETUP

GOLDEN AGE

(Continued from page 84)

may remember the large Cleveland Models version, for instance, but the one I remember best which would raise the eyebrow's of today's manufacturers was by Ideal Models. Like the Laser and P-51 of today, the market was flooded with Reliant kits. Ideal must have been inspired to produce a version to top them all. Like Gene Heydorn's scratch-built version, this one was exact scale, including the internal structure. Beyond that you assembled a detailed engine and complete operating controls.

Tom Ailes of Valpariso, Indiana, is a very active OT R/Cer and a recent letter from him included a photo of Douglas Mauer's WACO F from the early days. This was powered with an Anderson Spitfire. Note the added dihedral. With just rudder and elevator you needed some built-in stability. This one was also a successful flyer.

Others report early scale endeavors also, but unfortunately no usable photos to share with you.

Lastly I have another OT plan source. This one is a 25% enlarged Live Wire Trainer from Norman Rosenstock*. The plan is well drawn, and nicely detailed and engineered. You should like it.

Hal "Pappy" deBolt, c/o *Model Airplane News,* 632 Danbury Rd., Wilton, CT 06897.

**The following is the address of the person mentioned in this article:*

Norman Rosenstock, 94 Cedar Drive, West Plainview, NY 11803. ■

INSTALL A RADIO

(Continued from page 51)

the radio components.

Once your airplane is built and covered and the engine is installed, the arrangement of the radio components begins, starting with the servos. The placement of these control devices is important for a number of reasons. First, you want them to have a direct connection with the pushrods without any wire bending. (For more about pushrods, see my article in the September 1986 issue of *M.A.N.*) Next, you want the servos as close to the balance point as possible so that you don't have to add nose or tail weight to compensate for them. You must also position them so that there's sufficient room for a

padded receiver and the battery forward of the servos. This is so the wires for the various connections are not strewn all over the inside of your model.

Mounting the servos is the next primary consideration. They must be secure, but not too secure. By that I mean that they must be able to "float" somewhat in order to keep the vibration from the engine from destroying their innards. This is accomplished by using the servo grommets provided with the radio, as well as the servo mounting tray. By secure I mean that they have to withstand the force exerted on them by the movement of the pushrod to a control with as little reactive motion as possible. Keep in mind that the more your servos are allowed to move in their mounts, the less positive the control reaction will be.

How you mount the servos to the airplane is a very important consideration. This is done with the use of "servo rails," which are usually made from at least ¼-inch thick plywood, spruce, maple, or similar hardwood. Never use soft wood, such as balsa, for your servo mounting rails. For one thing the screws will quickly lose their bite or strip out. Also, even the slightest vibration can cause the screws to rotate out of their holes. If you use spruce, pine, or maple wood for the rails, always pre-drill the holes big enough so that the wood doesn't split when you put the screws in.

When you attach the servo rails to the sides of the fuselage, reinforce them with ⅛-inch thick plywood scabs (see photo). Make sure that before you install the servo rails, the servos have sufficient clearance between the output arms and the wing.

The battery on most models is located forward of the receiver and the servos, and usually under the fuel tank. It must be protected from vibration as well as fuel, in case of an unexpected leak. Wrap the battery in a foam-rubber sleeve and then wrap and seal it in a plastic bag. A Zip-Lock sandwich bag works well for this.

Sometimes it's necessary to shift the battery location around in order to get a model to balance. Once that is done, the receiver is next.

Installing the receiver is no big deal. Since it "floats," the location is generally determined by the available space left in the fuselage and the length of the servo wires. It's a good idea, however, to keep the servo wires away from the antenna. The signal that passes through them, as well as the voltage, generates an electrical field around the wires which can be induced into the receiver antenna, thus giving you some very strange signals, like glitches. By "floating," I mean it's not attached to anything within the airframe. It should be wrapped in foam and also a plastic bag like the battery and "nestled" in a convenient spot, usually between the servos and the battery.

The switch for your radio should be mounted on the side opposite the exhaust so that the residue doesn't work its way to the contacts. By the way, switches are also prone to the effects of vibration, so beware. This is especially true with large, gasoline engine-powered models. There's nothing commercially available to deal with this, but you can mount the switch on a plywood plate and attach the plate to a bulkhead or a rail inside the airplane with silicon adhesive, velcro, or servo-mounting tape.

Route your receiver antenna out of the fuselage at any convenient spot closest to the receiver itself. I like to use a servo grommet or a small piece of tubing to protect the antenna from chaffing at the exit point. Run the antenna back to the rudder and attach it with a rubber band to the stab. Be sure the tension is soft so you don't pull it out of the receiver.

Maintenance for an installed radio system is minimal, but necessary. Periodically check the servo-mounting screws, servo connections, antenna, servo wires, and servo gears for any abnormal condition.

One of most important things to remember when you install a radio in your airplane is to check and double check the direction of control travel with respect to the command given, and that there's no binding or slop in the controls.

If you do these things, your flights will be lasting and enjoyable. ■

CONTROL TOWER

(Continued from page 41)

C. Strobes: one set of dual synchronized xenon strobes and wiring sheet.

D. Batteries: one 1,300-1,500-mAh @ 6V Ni-Cd pack with Deans connector.

E. Charger: 110V AC input/6V 80-100-mAh output (with LED charge indicator) with charge connector.

F. Wiring: 10 feet of #24 wire (tail lights—red, blue, and white), 8 feet of #24 wire sync. line (strobes—yellow), 10 feet of #22 wire strobe and power (orange, black, and red), one 5 pin male Deans connector (wing lights), one 2 pin male Deans connector (tail lights), 3 inches of ⅛-inch heat shrink.

G. Digital controller, assembled and tested. The controller has female Deans connectors attached. You must solder wing and tail plugs and cut the wire to the desired length.

Another new product from McDaniel R/C is Model 135R, the Dual Output Charger. The unit is provided without connectors, which you must provide for your own particular transmitter and receiver. Designed for 12V DC input, this charger can be utilized on your way to the flying field or at the flying field. The 135R provides regulated outputs of 55 mAh or 325 mAh for one to seven cells selectable or non-regulated, current limited 11.5V at 280 mAh, 300 mAh, or 350 mAh for your transmitter. Most of the new PCM transmitters require this order of magnitude charging current for a fast charge. Ranges are changed by means of a three-position switch. It's a very versatile unit.

Also seen recently was a very handy product from Craft-Air* called the Prep Tracker, which makes 20 holes at a clip in a $2^{9}/_{16}$x$1^{13}/_{16}$-inch rectangle. The purpose is to puncture sheeting to let trapped air escape when using iron-on covering materials. I remember using a needle epoxied in the tip of a dowel for just such a purpose for years. The Prep Tracker is 20 times as fast and much easier to use. The unit assembles in about 5 minutes and is a welcome addition to my shop.

From Sonic-Tronics* comes the Nifty Slot Driver and wing hold-down hardware. I've used this mounting system in my last three ships and it eliminates completely those "dings" I used to put in the wing when my blade screwdriver slipped off the screw. Also new to me were the four-cycle glowplugs produced by Sonic-Tronics. They're well made and I've been using them in my Enya 80 and O.S. 90 four-cycle engines.

Last but not least is a battery pack I obtained from SR Batteries*. I originally wanted it for a small sailplane, but wound up using it in an R/C car after having fits with an interference problem when running the receiver and servos from the motor battery. It worked just fine and fit under the body of a $^{1}/_{12}$-scale formula I car. The pack was rated at 325 mAh, but only measured 2.3x1.3x0.6 and weighed 2 ounces. Give SR a try. They have a quality product, reasonable prices, and all sorts of configurations. See you next month with another new radio.

CONTROL TOWER

Charlie Kenney, c/o *Model Airplane News*, 632 Danbury Rd., Wilton, CT 06897.

**The following are the addresses of the companies mentioned in this article:*

McDaniel R/C, 12206 Guinevere Rd., Glenn Dale, MD 20769.

Craft-Air, 20115 Nordhoff St., Chatsworth, CA 91311.

Sonic-Tronics, Inc., 7865 Mill Rd., Elkins Park, PA 19117.

SR Batteries, Inc., Box 287, Bellport, NY 11713 ■

BIG HOTS

(Continued from page 20)

too much heat on the seams when you shrink the material with your heat gun.

Fiberglass Master* has the cowl and wheelpants for the Big Hots, which really saves some work. When mounting the engine, the most important aspect is the balance. Don't try to fit or trim the cowl until you're sure that the engine placement gives the proper balance. If you use a lightweight engine, such as the Bully or the Quadra, and you've built the tail a bit heavy, you might have to put the engine out ever farther than shown to get a balance. If all else fails, you might have to add some nose weight.

For the controls, I used an ancient Airtronics* radio with their heavy-duty servos. I used two servos for elevator and ailerons, and one for rudder, throttle, and smoke. I also used a 1,200-mAh battery pack with the heavy-duty wiring on the switch harness. All this is available from Airtronics. By the way, I say "ancient" because I've been flying this particular radio for over six years now without a hitch. Even after the fatal flight, the radio worked fine and I now have it in another ship.

FLYING. As I stated before, on the very first flight I did something I've never seen done with a model. Well, that's not all. On the second flight I did something that still amazes me. The first one came on takeoff. I had the engine set like I wanted it and had made several high-speed taxies, lifted the wheels off, and then let it settle. Everything looked good. It wanted to fly right off after only a short run so I decided to go off at half-throttle. As I added the power to it, the tail came up and it was running on the mains. I fed it a little up-elevator, the mains broke ground, and it went past me at an altitude of about 5 feet. There was a mound of rocks and cement at the end of the strip and I was so caught up in the airplane I forgot about the mound. I caught it out of the corner of my eye and realized I was headed straight for it. I went to full throttle and the engine died! So, there I was 5 feet high with no place to go. I still shake my head over this one. I couldn't possibly turn at that altitude and there were cars and trucks on the other side of the mound, so I considered crashing it deliberately into the mound. That thought lasted for a micro second. Instead, I gave it up-elevator.

To my utter amazement, the momentum of the airplane was sufficient to carry it in a vertical climb to about 150 feet. As it stalled, I kicked the rudder full left and the Big Hots pivoted on its axis like it was pinned to a wall. It came down the back side as gentle as I've ever seen, settled down directly in front of me, and rolled to a stop.

Like I said, I've never seen a model do that, and I doubt if I would ever attempt it again, intentionally or otherwise. This was one of those flights when you actually believe there is a model airplane god.

The other maneuver that had me excited was what I call a helicopter roll. At about 200 feet I pulled the model vertical and retarded the throttle to the point where it was just hanging on the prop. I then fed in aileron and the airplane rotated very slowly around the horizontal axis for 360°. Call it a torque roll or whatever, it was really something to see. When I had my smoke system set up, I did this maneuver and the Big Hots looked like it was buried in a cloud.

The Hots family has proven to be a lot of fun, both for myself and the modelers who enjoy this kind of airplane. The only thing is, I don't know what to do next. How about one you can ride in? Call it the Real Hots!

**The following are the addresses of the companies mentioned in this article:*

Bob Violett Models, 1373 Citrus Rd., Winter Springs, FL 32708.

Top Flite Models, Inc., 2635 S. Wabash Ave., Chicago, IL 60616.

Midwest Products Co., 400 S. Indiana St., Hobart, IN 46342.

Fiberglass Master, Rt. 1, Box 460, Goodview, WA 24095.

Airtronics, 11 Autry, Irvine, CA 92718. ■

IMAA FUN-FLY

(Continued from page 48)

The flight line was oriented at right angles to the prevailing wind and this factor, coupled with the limited flying area, intimidated some who might have flown had there been a larger and more convenient area from which to fly. The narrow runway and flight area, along with a stiff crosswind, hampered those whose confidence in their flying skills was not extremely high. Those who flew a good deal were the high skill level pilots

(Continued on page 94)

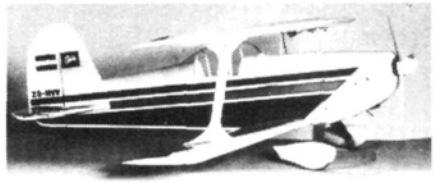
Product News

Flitecraft Solo 1

The Flitecraft Solo 1 is an almost-ready-to-fly trainer that's as easy to build as it is to fly. Advanced construction techniques and a very stable design make the Solo 1 a perfect choice for beginners. The fuselage is one-piece, specially reinforced and made of RSTP—a space-age, rubber-treated plastic. The pre-built, foam core wings are covered with a strong, laminated board which is already painted and impregnated with decals. Tail surfaces slide into pre-cut slots and attach and align quickly. Wheels, pushrods, foam tank mount, landing gear, and engine mount are all included. The Solo 1 spans 56 inches and requires a .35 engine and a 3- to 4-channel radio. The Solo 1 is distributed to leading retailers nationwide by Great Planes Model Distributors (P.O. Box 4021, Champaign, IL 61820).

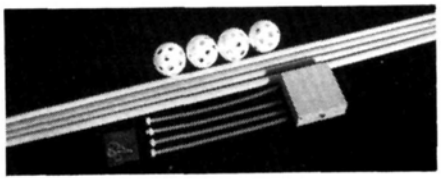
Altech High Torque Starter

The Altech high torque starter is built to last. The durable high-impact hand guards, front and rear, also provide a convenient no-roll stand. The grip switch, also made of high-impact plastic, has a raised bar—it will definitely last longer than a rubber strip which is easily corroded by model engine fuels. The raised bar switch allows fingertip control. Features include a machined aluminum starter cone with pulley trough for belt-starting boats and helicopters, a rubber spinner cup that uses high-density rubber that won't crumble or chip, heavy-duty low resistance wiring, heavy-duty insulation, and aligator clips for maximum power transfer. For more info, contact your hobby dealer or Altech Marketing (P.O. Box 286, Fords, NJ 08863).



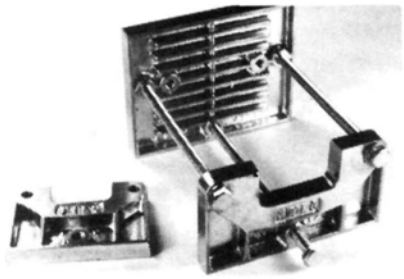
Circus Reed Falcon

The Circus Hobbies (3132 S. Highland Dr., Las Vegas, NV 89109) Reed Falcon, developed by Tony Bonetti and Ken Bonnema, is for Turnaround pattern and sport-scale enthusiasts looking for something new. The Falcon's groovy flight characteristics, sharp snap rolls and spins, and excellent tracking ability make it perfect for the contest buff looking for a unique, good-looking aircraft, yet it is stable enough for the intermediate to advanced pilot to appreciate. The Reed Falcon's construction is all balsa and ply (no foam) with a fiberglass cowl and wheel, clear canopy, aluminum landing gear, hardware package, full-size plans, and instructions. A 1.20 four-cycle or a .60 two-cycle and four-channel radio are required. Specs are a span of 54 inches, a length of 54 inches, and a wing area of 1,079 square inches.



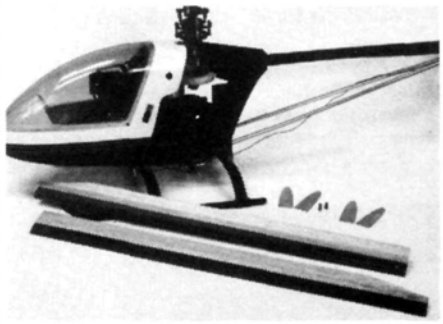
Yale Training Gear

Yale training gear is designed for the beginner to learn to hover with less repairs. The training gear kit includes four reusable nylon straps and complete assembly instructions. Disassembly is simple and the kit fits neatly in a modeler's field box. It's available from Yale Hobby Manufacturing (20 Holly Lane, Wallingford, CT 06492).



J'Tec's Drill Guide

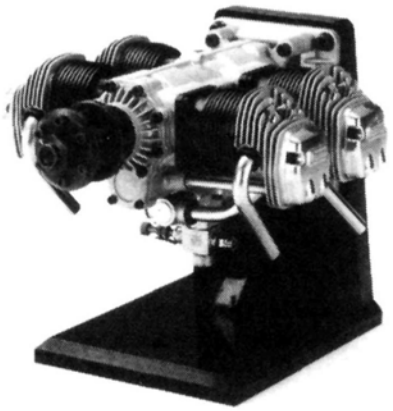
With J'Tec's (164 School St., Daly City, CA 94014) Drill Mount Master, accurately drilling out your motor mount is now a simple task. The exclusive tube hole guide system does away with laying out the engine mounting holes. With the engine mounted anywhere on the mount, holes are spotted and drilled to a perfect match. The drilling fixture insures a 90° angle to the mount surface. The fully adjustable aluminum fixture will drill mounts for .15- to 1.20-size engines. The unit comes complete with an ample supply of drill guides.



Kalt H-Series Rotor Blades

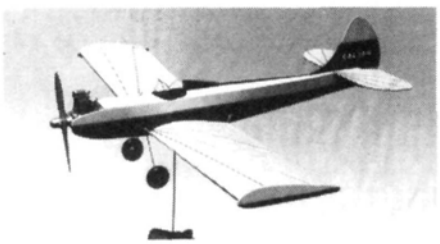
Kalt H-Series main rotor blades from Circus Hobbies (3132 S. Highland Dr., Las Vegas, NV 89109) were developed to meet the demand of the experienced pilot looking for performance and stability. They employ high-density composite wood materials for the leading edge, tip, and center section, bringing the center of gravity to an ideal position without adding ballast to the blades. These blades meet all competition safety requirements because there are no weights to separate from the blades. Excellent airfoil, flexibility, and elasticity create blades suited to hovering, auto rotation, and aerobatics. Available finished or unfinished in 680 mm length with instructions on how to size and install them on most .50- to .60-size helicopters.

Descriptions of new products appearing in these pages were derived from press releases supplied by the manufacturers and/or their advertising agencies. The information given here does not constitute endorsement by **Model Airplane News,** nor guarantee of performance or safety by **Model Airplane News.** When writing to the manufacturer about any product described here, be sure to mention you read about it in **Model Airplane News.**



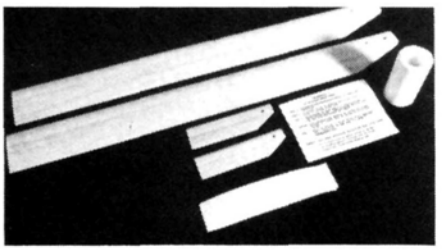
O.S. FF-240

The O.S. FF-240 four-cycle horizontal four-cylinder engine combines durability, performance, and power to form the ultimate in giant-scale engines. The FF-240 has a ringed piston and a ball-bearing-supported crankshaft for smooth operation and long life. This multi-cylinder design reduces vibration and produces an authentic airplane engine sound that giant-scale enthusiasts demand. The FF-240 weighs 70.6 ounces and has an rpm range of 1,800-8,000. Ideal for giant-scale applications, the flat-four design provides smooth operation. The O.S. FF-240 four-cycle engine is distributed to leading retailers nationwide by Great Planes Model Distributors (P.O. Box 4021, Champaign, IL 61820).



The DSC Caliph

The DSC Caliph is a sport trainer featuring simple construction, step-by-step instructions, full-size rolled plans and machine- and die-cut selected balsa and plywood parts. Included are sheet blasa fuselage sides, rudder, and elevator, as well as formed gear and hardware. The plans also show both the three- and four-channel versions. The Caliph is available from Davey Systems Corporation (One Wood Lane, Malvern, PA 19355).



Tru-Spin Blades

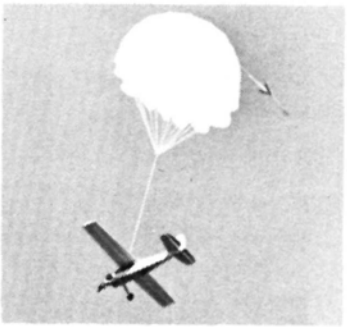
The finest quality main and tail blades are now packaged with heat-shrink covering material. Since white heat-shrink is most ordered with our blades, it's now included with them at no extra charge. The leading and trailing edges of our tail blades are made with a harder wood for less frequent tail blade damage from grass. For more info, write to Yale Hobby Manufacturing (20 Holly Lane, Wallingford, CT 06492).

Multi-Purpose Work Bench

This multi-purpose bench features a large plastic laminated work area, risers, and shelf, and is available in a wide color choice. Rugged steel supports and telescopic legs adjust the table top and shelf for stand-up or sit-down operations. Optional features include under-shelf lighting, pegboards, lazy susan CRT mount, drawers, modesty skirt, and lower shelf foot rest. The bench can be serviced with air and electric outlets. The multi-purpose bench can be used for data processing, modeling, or any application requiring a durable, attractive bench. Units are shipped knock-down with easy-to-read instructions. These quickly assembled benches can be combined to provide a variety of layouts. Contact Alden Systems Company (P.O. Box 860, 117 N. Main St., Brockton, MA 02403) for more information.

Kyosho Turbo Optima

Kyosho has gone one step beyond the already championship-caliber of the Optima with the new Turbo Optima. Standard improvements include 16 ball-bearings and 4 sophisticated adjustable pressure shocks. Along with the front and rear stabilizers for maximum stability, these shocks will give the racer smooth handling in jumps, corners, and rough terrain. The Turbo is equipped with a high-rpm LeMans 240S electric motor for excellent speed and a torque limiter for chain and sprocket protection. Other features are simply too numerous to mention here. The Turbo Optima is distributed to leading retailers nationwide by Great Planes Model Distributors (P.O. Box 4021, Champaign, IL 61820).



Navillus Air Brakes

Navillus Industries (Rt. 3, 7118 Kari Dr., Richmond, TX 77469) announces a breakthrough in the field of safe parachute recovery of R/C airplanes. Use the chute as a manual system or automate your Air Brake with our solid-state Missing Pulse Detector/Servo Driver unit. The MPD unit electronically monitors the radio receiver to insure it "hears" the radio transmitter. If the MPD unit detects an absence of the transmitted pulse, it will instruct the assigned servo to move in the proper direction to deploy the parachute. MPD comes with auxiliary power supply capability to protect against battery pack failure, and an adjustable delay.

IMAA FUN-FLY

(Continued from page 90)

and they put on an excellent show. Other less confident pilots remained on the ground, and well they might, given the prevailing conditions.

In addition to the orientation on the flight line, the width of the area in which flight was permitted was restricted by several large hangars and a Michigan National Guard helicopter facility which could not be overflown. The cooperation of the Guard Unit was superb, but the danger of flying over their facility was ever-present which might have intimidated some who had intended to fly and didn't.

To the credit of IMAA officials, they have made some changes which will prevent such a situation in the future. One of the IMAA's directors, Dick Garmhausen of Canton, Ohio, has been appointed festival coordinator and will oversee future festivals to assure that similar situations are not allowed to develop. His mandate from the board of directors will assure that future flying sites will be adequate to the needs of such a large event and to the needs of those who participate.

Another area of concern among those attending was the lengthy delays while no flying was being done and while waiting for a frequency pin. The low number of crashes might well have been due to the extreme care which was taken to preclude AM and FM frequencies flying together. While difficult to fault, such care did slow down the flying and there were long periods of time when only one or two models were airborne and periods when the skies were vacant. Hopefully both adequate procedures to assure more time in the air and better frequency rejection on the part of our radio equipment will assist in making more flight time available at such events. A better system of allocating flight time and assuring readiness of "next-up" fliers would also help. The IMAA has indicated they intend to address such problems at future festivals.

The IMAA is a rather young organization, just entering its sixth year. While it has some things to learn, it has grown at an astonishing rate and has shown mature and well-founded attitudes. There is little doubt they will be able to cure their festival problems and mount well attended, well run and exciting events in the future.

All in all, despite the problems, Festival '86 would have to be chalked up as a qualified success. It didn't lose any money and it did permit a gathering of giants. Festival '87 is at a yet unannounced location. The IMAA is also planning for Festival '88, which is a good idea, as preparing for such an event is a large chore and one which cannot properly be taken care of without adequate lead-time. Establishing some continuity in planning should also minimize future problems.

So, for those of you who like watching large birds fly and exchanging ideas with those of similar tastes, IMAA's rally of the giants was the place to be in July. Scheduling it one week in advance of EAA's annual bash at Oshkosh made it convenient to take in both events on one vacation trip. ■

T.F. HOLY SMOKE

(Continued from page 39)

area are completed.

Next add hardwood landing skid mounts, all pushrods, and the nosewheel mount, then complete the bottom planking. Adding the ¼-inch balsa vertical fin completes the basic airframe.

Hinging the control surfaces is next. I've been using the Granite State iron-on gapless hinges on all of my sport models because of the ease of installation and the benefits of increased control effectiveness. On the Holy Smoke I ran one piece across the entire trailing edge and hinged ailerons and elevator at one time. Slitting the hinge between ailerons and elevator allowed independent movement of each surface.

If you're in a rush to get an airplane in the air, you'll find that about a week of evening sessions is all that's required to easily complete construction. Using cyanoacrylate adhesives and accelerator is the key to fast and strong building. I used Satellite City's* Hot Stuff slow and gap-filling formulas exclusively for all construction joints on this model.

For covering the model I chose Top Flite's Super MonoKote for the basic color, and blue and red EconoKote for the trim.

For power I installed a Webra Speed 40 from Circus Hobbies* and for control I selected the new Futaba* 4NL Conquest.

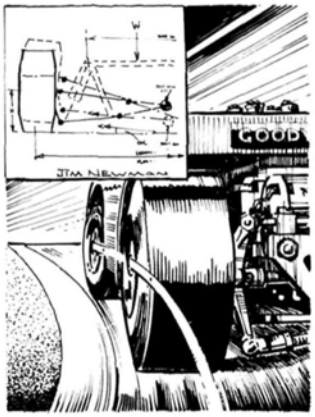
When I did the final check on CG location, the model turned out to be nose-heavy (because of the heavier engine and muffler). To compensate for this, I moved the battery pack back to the trailing edge and at this location achieved the desired CG.

FLYING. Now comes the moment we all look forward to, the first flight of our latest modeling effort.

With the Holy Smoke lined up in the center of the runway, I opened the throttle and the model shot down the runway as though on a catapault. Within 25 feet it rotated and was climbing out at a 45° angle and at a speed that caught me by surprise. Control response was extremely sensitive and I recalled that Top Flite had cautioned in the instructions book that sealed hinges would make flight surfaces 25% more effective. I spent the balance of the first flight doing Figure 8s, circles, and slow passes to get the feel of the airplane.

After readjusting clevises to cut down on control throws I explored the airplane's aerobatic potential. Because of

(Continued on page 110)



Inside Track

by MIKE LEE

THIS MONTH let's pay some attention to the road racing breed. This form of racing requires a skillful driver who is fast on the reflexes and keen to racing form, and to keep up with the pack he has to have good tires.

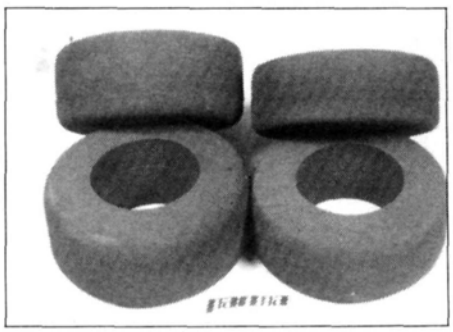
As most of you know, road race cars use a sponge rubber-type tire compound. While this type of compound affords gobs of traction on most road surfaces, it also wears down fairly fast due to the porous composition of the sponge rubber.

For newcomers, sponge tires are whatever came with the car, and that's that. Later on, this same guy wonders why other guys can make their tires hold the road better than his. The secret to improving traction is tire dressing, which can make all the difference in the world and is easy to do.

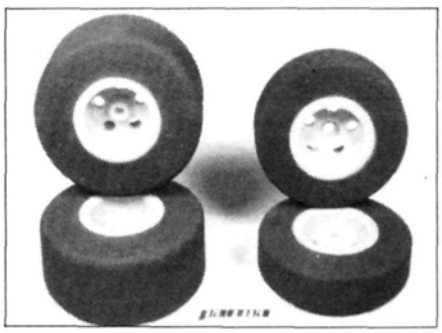
The simplest way to dress a sponge rubber tire is to apply a dressing. There are tire dressings available, one of which is Tire Pooky marketed by Model Racing Products*. The dressing softens the sponge rubber slightly, without destroying the delicate rubber makeup of the tire. The softer rubber, which is actually more pliable rather than actually softer, can grip the road surface better and produces better cornering ability. Plain and simple, huh?

Maybe you'd like to try your own tire dressing compound, so here's a formula to get you started. Get some Oil of Wintergreen and glycerin. Begin with a mixture of 25% Oil of Wintergreen and 75% glycerin. Mix thoroughly and apply to the tires.

Rub the dressing in with your fingers, spreading it evenly across the tire surface. This isn't a bad job, because the stuff smells pretty good. After dressing the tires completely, wrap them up in plastic bags until you're ready to run. The tires will be soft and you'll notice a difference right away. Just note that Oil of Wintergreen evaporates and that's why it's important that you wrap them until you're ready to race.

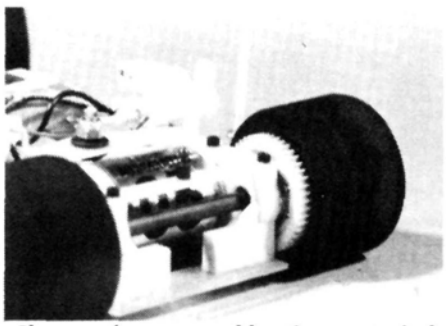


Cut and trued rubber tires from Parma are ready to install.



Pre-mounted and trued sponge tires from Parma are examples of commercially-available tires for the racing enthusiast.

Another way to dress tires is to cut them. Now, this is a controversial subject. The idea behind cutting the tires is to form small grooves and a tread, much like with full-scale tires. However, note that full-scale race cars use both treaded and slick tires to race on, depending on track conditions. Decide whether the track conditions call for treaded tires. On a smooth-surface track I prefer to run the slick tires and run the treaded ones on fairly rough surfaces. But, just in case you want to try this, let me describe this procedure.



Closeup of a sponge rubber tire on a typical road racing car. Note tire is not cut or treaded.

The easiest way I know to do this is to chuck the tires up in a drill. Find yourself a small file or other abrasive but sharp tool and begin to *carefully* groove the tire. Because the tire is only sponge, it will cut quickly. Don't go too deep into the rubber because a deep tread isn't required to get the proper effect. The groove should only be about $^{1}/_{16}$-inch deep.

Where do you place the groove? I make mine dead center on the tire, dividing it in half. I've seen other drivers place up to four grooves in a tire, but start with one, then drive the car. If you see an increase in cornering ability, you might want to see what another groove or two will do. Just remember, do this on a set of tires that are already worn so you don't ruin a good set in case the effect isn't what you wanted.

Of course, this is simple tire cutting. A quick look at some commercially-available tires may reveal some which have pretty sophisticated tread designs. These are normally hand cut, and take time to do. Note that tires which have been cut

Backside of Winner radio displays the antenna in stowed position.

will also wear faster. There is less rubber on the tire surface and the same amount of force driving them, so something has to give way and that something is the tire.

I've mentioned that sponge tires wear fast because of the nature of the rubber. And, while the commercially-available tires are really not very expensive, you might want to perform your own tire changes. After all, it's nice to save a buck or two, and after buying mounted tires for a while you end up with a whole workshop full of used tires and perfectly good rims. So, let's talk about how to change tires.

First locate a source for rubber doughnuts, otherwise known as the raw tire. These are available from most of the car and accessory dealers and manufacturers, such as Associated Electrics*, MRP, BoLink*, and Parma*. These doughnuts are bought by the bunch and are pretty economical. What you get is a bag full of rough-cut rubber doughnuts. All you need now are a glass bottle, turpentine thinner, and contact cement.

Fill the bottle with turpentine. The bottle should be deep enough to hold at least two tires with room to allow the thinner to cover them. Simply drop the tires into the thinner and come back the next day. You'll find that the thinner will have done its magic and the tires should slip easily from the rims with little, if any, residue. Don't use anything stronger than enamel or pine spirits thinner for this job. A stronger solvent might dissolve the rims, leaving a gooey bottle of molten plastic.

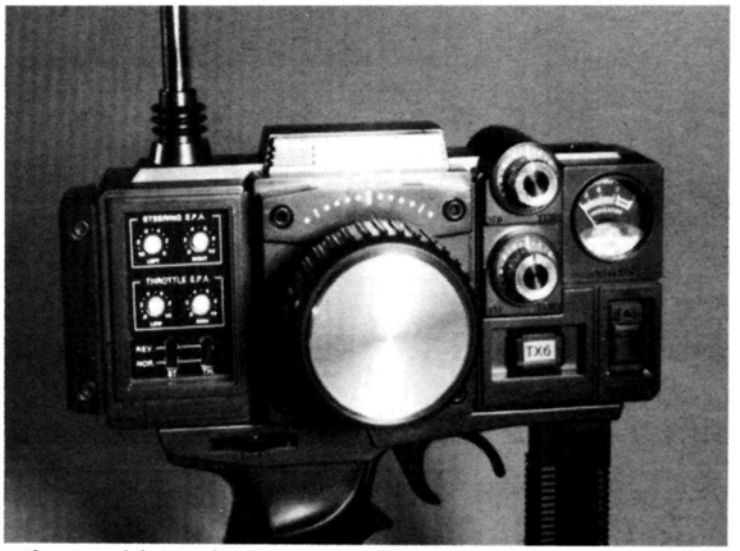
Now that you have the tires and rims separated, dispose of the old tire carcass and work on the new tire. To mount the new tire, carefully remove any residue from the rims and dry them completely. Using the contact cement, spread an even film of cement on the rim and then place a new tire doughnut on the rim. It should go on pretty easily. Wipe off any excess cement and let the tire and rim cure completely.

Now true the tire so that it's even and round. Again chuck up the tire and rim to the drill. Get yourself a *flat* piece of wood or metal that is at least the width of the tire and twice that in length. Using the contact cement, glue a piece of 150-to 240-grit sandpaper to the surface of the wood. Make sure that the sandpaper lays flat on the wood and is allowed to dry thoroughly. You can also use a spray-on adhesive to glue the sandpaper to the wood, as this allows easy changing of the paper when it wears out.

With the tire and rim mounted to the drill, place the drill on a steady surface and tie it down so that you don't have to hold it while it's running. Try and make the drill lay as level as possible in relation to the table, and then let her rip. With the drill running, lay the block of wood with the sandpaper on it onto the spinning tire. Hold on tight, because the tire will definitely pull the wood out of your hand if it's loose. The sandpaper will begin cutting down the tire quite nicely now, and very little pressure is needed to make it cut fast. Actually, the best way to do this is to nail down the paper block with door hinges and then you can just lay the block in the tire and watch. This also prevents the sandpaper from cutting in different directions.

Watch the tire cutting process carefully, and stop cutting when the tire is down to the desired size. Using the same block with the sandpaper, carefully sand the sides of the tire until it matches the sides of the rims, both sides. Rounding the sidewall at the corners is a nice touch.

That's it, you can now mount the tires and rims to the car. It's pretty easy, a little messy, and a good way to save a couple of bucks. Try it sometime, because you'll learn a lot about the tires you run just from working with them.



Closeup of front of Winner radio shows channel throw adjustments, reversing switches, and trim controls. Note the large size RF meter/battery meter on right side of radio. It's a highly recommended radio system for driving.

New Products

I want to talk about a new radio available from Circus Hobbies*. Circus is marketing the new Winner Series radio for use with surface-based vehicles. It's a trigger-operated, two-channel radio available on 27 MHz or 75 MHz frequen-

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T.F. HOLY SMOKE

(Continued from page 104)

the absence of rudder control, spins and wingovers are not part of this airplane's repertoire, however, all other maneuvers, including knife-edge, are possible. Horizontal and vertical rolls are spectacular and loops, Cuban Eights, and Split Ss are all precise and effortless.

For hot dog pilots, a high-revving .40 or .45 will keep the adrenalin flowing, but for the less experienced I suggest a .35 or docile .40 to be more than adequate for enjoyable flying.

So if you're looking for a change of pace and an airplane that's capable of providing all the thrills you chose to set it up for, then build a Holy Smoke 40. You'll enjoy it.

**The following are the addresses of the companies mentioned in this article:*

Top Flite Models, Inc., 2635 S. Wabash Ave., Chicago, IL 60616.

Satellite City, P.O. Box 836, Simi, CA 93065.

Futaba Corporation of America, 555 West Victoria St., Compton, CA 90220.

Circus Hobbies, 3132 S. Highland Dr., Las Vegas, NV 89109. ■

INSIDE TRACK

(Continued from page 109)

cies. It's manufactured by JR Radios of Japan and comes as a complete system package. The package contains a trigger-actuated transmitter, two NES-505 servos, an incredibly small receiver with changeable crystal, a battery holder for the receiver, a battery case for the transmitter, and a switch harness. Of course, an illustrated instruction manual and warranty are included.

The Winner transmitter features most all of the required and desired niceties that a radio should have: servo-reversing on both channels, end-point adjustment for both channels, separate and discreet trim adjustment knobs, adjustable steering wheel tension, highly visible RF meter, and a charging jack. The transmitter comes as a dry battery unit, however the use of rechargeable batteries is welcome and can be recharged through the existing charge jack.

The controls on the Winner are well placed, borrowing much from other current trigger radio designs. The steering wheel is not reversible on the face of the radio, but this left-handed driver found no problem steering with the right and throttling left. The trigger itself is also

(Continued on page 114)

Offshore

by JOHN OIAN

"WARNING! Contains sulfuric acid. Avoid contact with eyes, skin, or clothing. Batteries produce explosive gases. Keep sparks, flame, and cigarettes away. Ventilate when charging or using in an enclosed space. Always shield eyes when working near batteries."

SOUND familiar? It should. This is the warning found on all lead acid batteries. Unfortunately, it's too often ignored. To bring the point home, let me tell you about Mel Schmidt, a well-known West Coast free-flighter (free-flight airplanes are one of my other vices).

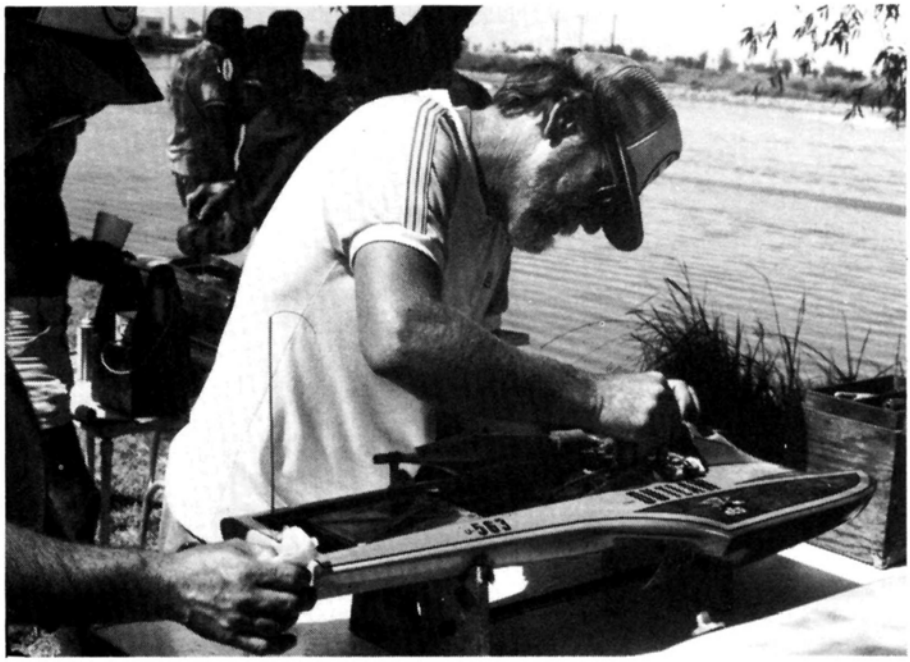
Mel was charging his starting battery (the same type most all boaters use for their starting boxes) because he noticed that the meter on the charger was reading zero. He checked the charger connection to the battery by the time-honored—but dangerous—method of jiggling the connector. When he did this the meter jumped, so he moved the connector again to make sure the contact was good. This time he saw some sparks fly from the clip and the next thing he remembers was waking up in the hospital, blind in both eyes.

Fortunately, one eye has returned to normal. Unfortunately, the other eye was damaged beyond repair by battery fragments and to this day is still sightless.

The battery exploded with such violence that his neighbors came running over because they thought a bomb had exploded. The force of the explosion knocked him unconscious and blew his glasses off his face. (So much for the protective eye wear part of the warning.) The explosion also completely destroyed the battery, leaving only some of the plates and part of the bottom of the case intact.

Why did this happen and what can we, as users of lead acid batteries, do to prevent such accidents? First, the explosive gas referred to in the warning label is hydrogen. This gas, when mixed with oxygen, produces a highly explosive mixture. Have you ever noticed the little stream of bubbles coming off the plates of a charging battery? They contain hydrogen and when this mixes with the oxygen in the air, you have the makings of a potential disaster. There are two very well publicized examples of what can happen when hydrogen, oxygen, and an unwanted flame meet. The first was the German airship, the Hindenburg, which exploded while docking. (The early airships all used hydrogen as a lighter-than-air gas, but now safe nonflammable helium is used, so you have nothing to fear from the friendly Goodyear blimp.) More recently we have the explosion of the space shuttle Challenger, whose liquid rockets used hydrogen and oxygen for fuel and we all know what happened there.

So much for the possible consequences. What can be done to prevent such a mishap? Well, let's go over a few simple rules.



Don Tippin adjusts his Super-Tigre .65 installed in sport 40 hull.

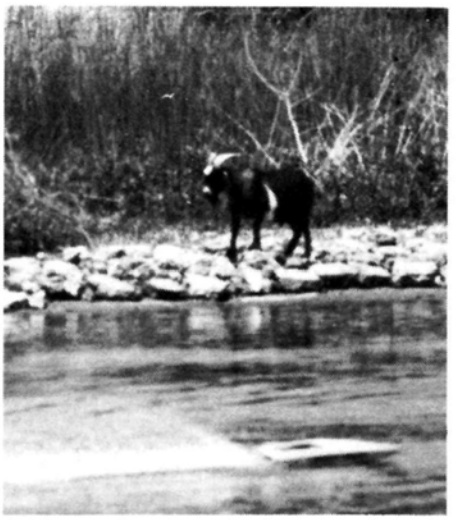
Never ever connect a completed circuit directly to both poles of a lead acid battery. This will invariably produce sparks, which can be the beginning of the end for both you and your battery. Make sure you have a good connection to both battery terminals *before* you plug in the battery charger. Also make sure that all connections to the battery terminals (starter, fuel pump, power panel, etc.) are very tight and electrically sound. If they are loose, they will spark and cause the same problems.

If you ever have to connect a completed circuit to a battery, connect the positive lead to the positive pole, then connect the negative lead to some part of the ground system away from the battery. For example, when you jump-start a car, connect the positive lead to the positive battery terminal, then connect the negative lead to some part of the car completely away from the battery. When you see the sparks you'll know why you did it this way. By the way, "away" also means away from the fuel system; don't

substitute gasoline fumes for hydrogen.

When you disconnect this system, make sure you disconnect the remote negative lead first so any sparking will be away from the battery.

I'm as guilty of this as anyone. I fly a lot of electric airplanes and I used to hook the charger to both battery poles. Boy, did the sparks fly! Luckily that's all that flew. Now the negative clip goes where the battery isn't and I still get sparks, but I'm much less likely to blow myself up in the process.



One of the boat-hungry goats stationed on the island waiting for a meal. See text.

Always use and charge your battery with good ventilation. An enclosed battery may look neat, but it's a very good place to build up an excess of explosive gases. If you do chose to enclose your battery, be sure it's well ventilated.

I'm not that familiar with the newer Gel Cell type batteries, but I think it would be prudent to follow the same safety rules with them, just to be on the safe side. End of safety lecture.

Boating California Style

I recently moved to California from Florida so now I see what model boating is like on the other coast. I just attended my first California race, unfortunately only as a spectator. Most of my boat stuff is spread out between Florida and California.

This race was held by the Bakersfield Wavemakers at a place called Costerisan Farms. The race site was unique, to say the least, because the lake is on a *very* large farm. The owner of the farm has quite a few interesting pets, including a small herd of buffalo and a collection of goats on an island in the middle of the lake. These goats have been known to do a little chewing on wayward boats that have the misfortune to venture into their territory. There's also a nest of Canadian geese with two very protective parents who attacked a small deep-vee that ventured too close to the shore. In addition to the usual obstacles on the course, such as dead boats and buoys, etc., there were a couple of beautiful and expensive black swans, which periodically cruised through the course.

Dick Wright's twin K&B .60-powered X mono.

The main difference I see so far between model boating in Florida and California is in the way the races are scheduled. In Florida, all classes are run on both days of all races. Here, there are completely separate races for Scale, Outboard, and heat racing (hydros and deep-vees). The heat racing weekends are further divided by running the deep-vees on one day and the hydros on the other. The system seems to work quite well,

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INSIDE TRACK

(Continued from page 110)

not adjustable, providing about 70% throw to the handle side and 30% throw to the braking side. The trigger tension is fixed as well.

The Winner radio provides a good, hefty feel with a nice weight distribution, making it comfortable to hold. In actual operation, the steering wheel has plenty of spring action with about 110° of turning allowed. The antenna exits the transmitter from the inner left-hand position, preventing top heaviness. The antenna can be stowed into the back side of the transmitter with built-in clips.

The receiver provided is really a jewel. Very small in size, it has a block connector on the right side for fit to JR servos only. Performance from the receiver was flawless, even on the "acid test" 27 MHz frequencies. And, believe me, in the open stretches of the Southwest, everyone and their mother has a CB!

The servos are the tried-and-true NES-505 servos, a standard servo within the JR line. These servos are medium size with hardened cases, gears, and splined output shafts. Several extra servo arms are provided for assorted applications. Power output from the servos is rated above 35 ounce-inches, making them plenty strong enough for the car scene.

I tested the Winner at my local track, placing the unit into the new Cox Turbo Scorpion off-roadster. I experienced flawless operation from the Winner, even with six cars running besides mine, most of them on the 27-MHz band as well. With this kind of field testing, I can rate the Winner a very good radio package, especially with a selling price of $89.95. See Circus Hobbies for more information on this fine piece of equipment.

That's all for this pit stop. 'Til next month, foot to the floor and happy motoring,

Mike Lee, c/o *Model Airplane News,* 632 Danbury Rd., Wilton, CT 06897.

**The following are the addresses of the companies mentioned in this article:*

Model Racing Products, 18676 142nd Ave. N.E., Woodinville, WA 98072.

Associated Electrics, 1928 E. Edinger, Santa Ana, CA 92705.

BoLink R/C Cars, Inc., 420 Hosea Rd., Lawrenceville, GA 30245.

Parma International, 13927 Progress Pky., N. Royalton, OH 44133.

Circus Hobbies, 3132 S. Highland Dr., Las Vegas, NV 89109. ■

ENYA 30 & 30-RING

(Continued from page 45)

form it is simply designated "30-BB."

As in the case of the Super-Sport 25s, the ball-bearing equipped version of the 30 has one or two other luxuries not found on the plain bearing models, such as an Enya G-5.5 carburetor with fixed automatic fuel metering in addition to the adjustable airbleed idle-mixture control found on the simpler carburetor fitted to the standard 30. The muffler supplied with the plain bearing 30, however, is the same M251 type supplied with the ball-bearing engine, not the smaller volume M250 supplied with the plain-bearing 25.

A comparison between the checked weights of the 25 and 30 models reveals that the bigger displacement models are actually fractionally lighter than the 25s. This is due to the fact that the 30 size cylinder liners are reduced in wall thickness from 1.8 mm to 1.2 mm—necessary to accommodate the 30's larger cylinder bore within the same sized casting.

Except insofar as they are similarly affected by differences in bore and stroke, other internal parts and dimensions are also similar to those of the 25 models. Thus the standard 30 crankshaft has an 11.5 mm diameter main journal running in a bronze bushed main bearing, whereas the 30-RING shaft has a 12.0 mm main journal and runs in 12x24 mm and ¼x¾ in. ball bearings.

The two engines share the same cylinder head, although, as the data table shows, the measured combustion chamber volumes produced slight variations in compression ratio. The ringed aluminum piston is of course much lighter, approximately 5½ grams lighter, in fact, than the cast-iron piston. The complete piston, rod and wristpin assembly for the 30-RING checked out at only 8.1 grams, compared with 13.6 grams for the lapped piston engine.

According to the manufacturer, the best prop size for these two Super-Sport 30 models is 9½x6. Both engines will operate satisfactorily on a straight 80/20 blend of methanol and castor-oil (or a good quality synthetic) or, for extra power, on a fuel containing a moderate quantity (10-15 percent) of nitromethane.

Peter Chinn, c/o *Model Airplane News*, 632 Danbury Rd., Wilton, CT 06897. ■

FLOATING

(Continued from page 81)

parallel. Floats must not be staggered fore and aft. Epoxy or screw hardwood feet to float decks.

17. Make up and install cables; silicone-glue aluminum tubing to gear as shown. Crimp tubing slightly to prevent cable shift. Use nylon clevis at nose and EZ connectors at rudder tillers. Check for binding.

18. Balance plane at normal CG—add necessary weight to floats for simple exchange of float for land gear.

A setup like this will invariably produce a true running waterborne plane. You'll find far less tendency for the plane to yaw and ground loop than it did on land, even with a trike-gear setup. Make a few practice runs your first time out. Get a feel for the rudder controls in the taxi, displacement, and planing modes. Control your takeoffs with throttle and just a breath of elevator at lift-off.

If you've flown your first floatplane as a landplane you can be assured of success. The floats add parasitic drag to a plane, but do not adversely affect its flight performance. Fuel consumption will be up, top speed with be down by about 10%, and flight characteristics will be

softened and smoother. When you stop shaking, you'll wonder what all the fuss was about. Float flying is simply the ultimate blast in radio-control flying.

Next time around, we'll take a look at Mike Johnson's completed GeeBee E, along with Gary Emerson's pattern plane on floats. Meanwhile, I'd like to hear from those of you who have taken the plunge and tried float flying. Send any good contrast black and white prints you can spare, specs, and a flight report, and I'll throw it in as time and space permit. Don't forget an SASE for answers and remember, wetter is better.

John Sullivan, c/o *Model Aiplane News*, 632 Danbury Rd., Wilton, CT 06897.

**The following are the addresses of the companies mentioned in this article:*

Zenith Aviation Books, P.O. Box 1, Dept. MN086, Osceolo, WI 54020.

Carl Goldberg Models, 4733 W. Chicago Ave., Chicago, IL 60651.

Great Planes Model Distributors, P.O. Box 4021, Champaign, IL 61820.

Sig Manufacturing Co., Montezuma, IA 50171.

Coverite, 420 Babylon Rd., Horsham, PA 19044. ■

CANADIAN FLY-IN

(Continued from page 30)

I'd like to share some other highlights of the meet. I finally got to see Mark Frankel's Javelin fly, and it's a good thing too, 'cause I understand that at a subsequent gathering one of the carry-through bulkheads failed, causing the wing to assume a carrier deck storage position, resulting in a 360° per second roll rate which concluded with the real estate directly below being covered with 26 pounds of day-glo orange wreckage. Undaunted, Mark is building yet another—number 3!

Don Kinch flew Jack Tse's SR-71, Me-262, YF-17 Cobra, and F/A-18 Hornet, and probably some others when I turned my head. Don is really a good stick and retains his cool demeanor even in the face of problems like a dual engine flame-out. He stretched the glide and didn't extend the gear until he was over the numbers at about 10 feet. I like that!

Bob "Hot Dog" Fiorenze was seen loading a complete set of F-18 parts purchased from Jack Tse (glass fuse, foam cores, and canopy) into his trailer at the conclusion of the meet. What can this mean?

NAME THE PLANE CONTEST

Can you identify this aircraft?

If so, send your answer to: **Model Airplane News,** Name the Plane Contest (state issue in which plane appeared), 632 Danbury Rd., Wilton, CT 06897.

In 1940 the Department of Defense was accepting open bids from all regions of aviation for an inexpensive two-place low-wing trainer. The mystery airplane in the September 1986 issue of *M.A.N.* was one of these airplanes. Of wood and fabric construction, it was built by Plyweve Aircraft Company and was designated the CT-6A SN#1. It carried the registration number NX19994. Current FAA records show the airplane to be the only example produced by Aero Industries Plyweve division, a company headed by John Greenleaf who was instrumental in the design concept. There is no other information available to us on this airplane and we would welcome more since it would make an excellent model. There were no correct entries received.

The winner will be drawn four weeks following publication from correct answers received by postcard delivered by U.S. Mail. If already a subscriber, the winner will receive a free one-year extension of his subscription.

CANADIAN FLY-IN

Tom Cook was overheard to say he was leaving his venerable F-4 in Canada. Could this be an addition to the Air Force of the amazing Dr. Tse? What can *this* mean?

Mike Krizan, all the way from Austin, Texas, was seen stuffing A-10 fuselage molds into Frank Fanelli's (*Flying Models* magazine) Honda bound for Uravitch's house. Know what this means? I do! It means since I still haven't gotten them, Frank was either lost in Niagra Falls or he better have a great explanation!

This first time event was really exciting, in spite of some really ugly weather. Everyone went away looking forward to a similar gathering next year. How 'bout it, guys?

Rich Uravitch, c/o *Model Airplane News,* 632 Danbury Rd., Wilton, CT 06897.

**The following are the addresses of the persons and companies mentioned in this article:*

Dr. Jack Tse, 122 Poplar Heights Dr., Etobicoke, Ontario, Canada.

Jet Model Products, 304 Silvertop, Raymore, MO 64083.

Bob Violett Models, 1373 Citrus Rd., Winter Springs, FL 32708.

Bob Parkinson Flying Models, RR #1, Queensville, Ontario, Canada L0G 1R0. ■

FROM THE COCKPIT

(Continued from page 73)

parcels to Germany, the fighter pilots found it all but impossible to get close to the tightly-packed bomber "boxes" which bristled with .50-caliber machine guns. One method they developed to break the boxes was to mount 21-centimeter (not millimeter) mortars on 190s and they would lob mortar shells into the formation. This proved so successful in breaking up the formations that on the famous Schweinfurt raid they so dispersed the bombers they knocked down nearly 50 percent of the B-17s that arrived over the target.

Another modification involved mounting as many as six 37-mm cannon barrels projecting straight up from the airplane. They were fired by a photoelectric cell that reacted to the shadow of a bomber as the 190 flew under it.

The tiny little Fw-190 was loved by all who flew her because of her quick, nimble nature and her ability to perform and inflict damage. She was a joy to take off and land, and in her many variations never failed to do the job at hand. She was,

(Continued on page 122)

Club of the Month

The Edmonton Radio Control Society of Alberta, Canada, is the *Model Airplane News* "Club of the Month" for November 1986. This club of over 100 active members tries real hard to have a good time at their flying field, when they can get to it! This summer has been unusually wet and Club President Mo Alam is seriously considering the acquisition of a swamp buggy to help members get to the field. Their new field isn't a lot better, but it's certainly better than nothing. Newsletter Editor Gerry Van Dyk reminds members that rain gear and galoshes are the order of the day, as well as canoes should members have them.

This club is into all kinds of R/C activities, such as pylon racing, pattern, scale, and sport flying. John Gemmell is excited over Quickie 500 racing and is trying his best to convert the rest of the membership.

On a decent weekend (anything less than hurricane conditions) at least 50 to 60 members show up for some fun-flying, which this club believes in more than anything else. Of course, safety and cordiality are paramount.

For this club's outstanding efforts, *Model Airplane News* is pleased to award two free one-year subscriptions, which are to be given by the club to their deserving junior members.

Congratulations!

Each month **M.A.N.** will select the club newsletter that best shows the club's activities and energies directed toward the furtherance of the hobby. The award is not based on size or quality of the newsletter, and can be about any aspect of the hobby (F/F, C/L, R/C, boating, cars, etc.). **M.A.N.** will award two free one-year subscriptions to be given by the club to outstanding junior members. So send your newsletters to **Model Airplane News,** Club of the Month Contest, 632 Danbury Rd., Wilton, CT 06897.

FROM THE COCKPIT

(Continued from page 120)

like the Mustang, born to fight her way into the folklore of aerial combat as a renaissance warrior capable of taking on all comers. Although she was eventually beaten, it was only through seige tactics in which she was starved for nutrition in the form of gasoline and could no longer carry the fight to the enemy. She remained, to the end, never truly beaten in battle. ■

publication and you can subscribe by calling toll-free 1-800-243-6685 (credit card orders only) or by sending your check or money order to Air Age, Inc., 632 Danbury Rd., Wilton, CT 06897. Subscription rates are $9.95 for one year (four issues) or $17.95 for two years (eight issues). The first issue is expected by the end of October, so order your subscription today.

John Oian, c/o *Model Airplane News*, 632 Danbury Rd., Wilton, CT 06897. ■

OFFSHORE

(Continued from page 113)

giving those who race only one type of boat a free day to spend doing what they want, or an extra travel day. The free day is really great, especially for the three races that are held in Las Vegas each year.

The only apparent difference in equipment is that there seems to be more fancy paintwork out here. Another thing I noticed right away was that there are a lot of races held each year. This year's schedule shows a full thirty races scheduled in NAMBA district 19 from February through October. Whew!

Included this month are a few pictures from the Bakersfield race. Unfortunately I was only able to attend the deep-vee day, which should explain the apparent bias.

Great News for Boaters!

In case you haven't heard, the publishers of *Model Airplane News* are putting out a new magazine strictly for us boaters! Called *American Boat Modeler,* this all-new publication will be chock full of helpful hints, how to's, kit reviews, and everything else you wanted to know or read about boats.

American Boat Modeler is a quarterly

HELICOPTERS

(Continued from page 52)

training stand is almost impossible, however, stands are relatively expensive and they don't give the flier the full feel of the machine.

The most common accident for the novice pilot is a tipover. The stance of the standard landing skids is relatively narrow and the machines can easily tip over. When this happens the main rotor hits the ground and many parts get rearranged. The solution is quite simple; increase the size of the landing gear. Many designs for training gear have been tried but the main object is still the same: to increase the "footprint" of the machine. The simplest and possibly the best way to do this is to fix two criss-crossed ⅜-inch dowel rods to the landing skids with rubber bands. The dowels should be 28 to 36 inches long depending on the size of the helicopter. Fiberglass arrow shafts can also be used. Plastic "whiffle" balls (hardball size) should be fitted to the ends of the rods to prevent the tips of the rods from digging into the ground. These balls should be attached so they can spin freely. The gear must be firmly attached or it will not work so use three or four rubber bands at each corner. With the training gear attached,

the machine can fall two or three feet with little or no damage.

That's all for now. Next month I'll discuss learning to hover. ■

H.S. FOCKE-WULF

(Continued from page 58)

rapidly than a pattern bird, due to its greater frontal area. This can be turned into an advantage under certain conditions. How many times when landing have you overshot with a slippery pattern ship on a shorter field. Simply keep a little throttle in hand until just before touchdown.

Slow flight is very good with the Focke-Wulf, which made slow passes for the camera an enjoyable task. I set the low position on my dual rates as per the plans, judging them a bit conservative. As it turned out, I did use the higher rate on elevator, but this is no doubt due to the slight nose-heaviness. In general, the recommendations in the instructions, although conservative, seem to be a good place to start.

On the ground, with the aid of a bit of toe-in on the mains, the 190 tracks extremely well, requiring only a small amount of right rudder for takeoff. The O.S. FS 90 was more than enough power with vertical performance being so good that, in retrospect, a strong four-stroke 60 would've given tall top hats and victory rolls.

From what I've seen at the local field, some of you guys still aren't using sufficient pitch on your four-stroke-powered models, particularly the faster monoplanes. I'm using a Zinger* 13x6-10 on the Focke-Wulf/O.S. combo and I'm convinced it's the pitch that really kicks in and takes advantage at higher speeds. The performance of the 190 with the O.S. was completely gratifying.

In the past I've had to eat my words by stating that Hobby Shack will not be able to top their latest addition to the EZ line. I'm still tempted. However, with my increasing belief that these "kits" come from some sort of fantasy land of Oz where magic is an everyday occurence, I just sit and wait in quiet anticipation for their next offering.

**The following are the addresses of the companies mentioned in this article:*

Hobby Shack, 18480 Bandilier Circle, Fountain Valley, CA 92728.

Coverite, 420 Babylon Rd., Horsham, PA 19044.

Pacer Tech, 1600 Dell Ave., Campbell, CA 95008.

Ace R/C, Inc., Box 511C, Higginsville, MO 64037.

Great Planes Model Distributors, P.O. Box 4021, Champaign, IL 61820.

Jo-Z Products, Inc., 25029 S. Vermont Ave., Harbor City, CA 90710. ■

R/C NEWS

(Continued from page 76)

there for adult recreational flying and overpriced business traffic (which in the final analysis I also pay for). R/Cing is an adult activity in the main; the "junior" issue will be the subject of a future tirade. If we are engaged in a legitimate adult activity, we should have equal access to public open areas. After all, we are paying part of the price.

To obtain our fair share will require using whatever political clout we can muster through our national organization, our club affiliation, personal contacts, and letter writing. In other words, R/Cers must become activists if we are to gain public (and/or private) areas for flying. We must cease to be apologists for others'

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Classified

RAZOR BLADES: single-edge industrial quality, super sharp. 100/$4.25, 200/$8.50, 300/$12.50, 500/$20.50, 1,000/$40.50; add 10% postage west of the Mississippi. Cobbie's Gifts, Box 2, Deal, NJ 07723; 201-922-9898.

THE BEST OF WYLAM, BOOK IV: Don't miss this W.A. Wylam classic. *Book IV* covers "The Stinson Story" and "The Curtiss Family." Book is $5.00, plus $1.75 for UPS shipment. *M.A.N.*, 632 Danbury Rd., Wilton, CT 06897.

WANTED: RTF U-Control planes from Cox, Wen-Mac, Comet, Aurora, Testors, etc., complete or pieces, buy or trade. John Fietze, P.O. Box 593, Lynbrook, NY 11563.

VIDEO ON COVERING: *Model Airplane News* presents an hour-long, professionally produced, instructional video cassette on envelope covering by Dick Phillips. For beginner or expert, regardless of plane size. Ideal for clubs and hobby shops too! Each cassette is $39.95 (specify VHS or BETA), plus $1.75 postage and handling (foreign and Canadian orders, add $3.00). *M.A.N.*, 632 Danbury Rd., Wilton, CT 06897.

ANTIQUE MODEL IGNITION ENGINES—PARTS CATALOG, 50 pages, precision cast timers, original cylinder heads, point sets, drive washers, tanks, for GHQ, O&R, O.K., many others. Large catalog $4.00 pp. Chris Rossbach, RD 1, Queensboro Manor, Gloversville, NY 12078.

HARDWARE AND SOCKET HEAD cap screws, all sizes, low prices. Write for complete list. Example 6-32x1" only $4.25 per hundred. Micro Fasteners, P.O. Box 42A, Netcong, NJ 07857.

SCALE DOCUMENTATION: PLAN ENLARGING, photo packs, 3-views, drawings for 1,600 aircraft. Super-scale R/C plans for giant, sport, 30-page catalog $3.00. SASE for information. SPPS, 3209 adison, Greensboro, NC 27403-1424; 919-292-5239.

R/C WORLD, ORLANDO, FLORIDA, CONDOMINIUM VACATION RENTAL: Spacious two-bedroom, two bath beautifully furnished. Fly with other modelers on site on 100-acre flying field, paved runway, huge screened-in hangar, swimming pool. Minutes from Disneyland, Epcot Center, R/C car tracks, Kennedy Space Center, golf, and other attractions. Truly a family vacation spot. Rental available weekly, monthly, seasonal. For information, write to Debbi O'Connell, Air Age, Inc., Condo Dept., 632 Danbury Rd., Wilton, CT 06897, or call 1-800-243-6685.

SIX NEW 1" = 1' CONSTRUCTION BLUEPRINTS for "flying-scale" aircraft. Large S.A.S.E. for details. S.A. Lambert Jr., Apt. 308, 2200 W. Cornwallis Dr., Greensboro, NC 27408; 919-288-2944.

PRIVATE COLLECTION: Hundreds of aviation magazines for sale—*Popular Aviation, Flying, Model Airplane News, Air Trails, RAF Flying Review, Wings,* and many others. 1932-1960. All in excellent condition. Send $2 for list. William C. Fort Jr., 4161 Robin Hood Rd., Jacksonville, FL 32210.

WANTED: Model airplane engines and model race cars made before 1950. Jim Clem, 1201 E. 10, P.O. Box 524, Sand Springs, OK 74063.

R/C SCALE PLANS: Curtiss P6E, Curtiss Gulfhawk, others—1/6-scale $22.50, 1/4-scale $35.50, catalog $1. Richard Barron, 11506 Ohio Ave., Youngtown, AZ 85363.

SCALE DRAWINGS of flying wings and other unique aircraft. Send $2 for catalog to: Bill Young, 8106 Teesdale Ave., N. Hollywood, CA 91605.

FOR SALE: Brazilian-produced T.M., Sassi, Mobral glo engines, .15, .40, .46, S.T.D. and R/C. Udo Eugen Linke, Caixa Postal 24, 18.130—Sao Rogue S.P. Brasil.

SELL CHOICE PERSONAL ANTIQUE gas model ignition engine collection $3,900 or best. 1½-hour video (VHS only) describing all engines. Video tape only $49.95 plus $2. Jule Dews, 7703 Baltimore National Pike, Frederick, MD 21701.

OLYMPIC COLLECTORS: Newsletter features news, ads, tips for beginning collectors and where to write for free pins. Three sample copies sent free. WJ Nelson, Box 41630, Tucson, AZ 85717-1630.

BOOKS BY HARRY HIGLEY: *There Are No Secrets,* a complete presentation on finishing model aircraft, including paints, adhesives, heat-shrink plastics, shaping, sanding, priming, and more. *Harry's Handbook For Miniature Engines* covers everything from basic theory, components, and fuel to break-in, repair, and new developments. Many photos, line drawings, and charts. *Master Modeling* explains drawing plans, how to scratch-build, how to use plastics, foam, and fiberglass, and also how to work with more common balsa and plywood. *Tom's Techniques* is from Tom Ingram, two-time "MonoKote Best Finish Award" winner at Toledo, in collaboration with Harry Higley. Book covers applying plastic film to yield eye-catching results. Topics include covering wings, fuselages, Horner wing tip fillets, etc. Hundreds of photos provide step-by-step instructions. All books are $10.95 each, plus $1.50 postage per book ($2.00 per book for foreign orders). Send order to *Model Airplane News,* 632 Danbury Rd., Wilton, CT 06897.

FOR SALE: New and used Kraft System radios. All have been thoroughly gone over with new Ni-Cds, etc. Many other brands of U.S. made R/C equipment. Send SASE for current listings. We still have need for used American-made radios, especially Kraft 7C and 5C. Only 25 Channel Master Systems left at our bargain price of $125.00 per set. 8FD receivers and FM modules now only $100.00 per set. Outrageous discounts on Schluter Helicopters and parts through our new affiliation with Alikas Helicopter Service here in Hilo. Jay-En R/C Sales, P.O. Box 4248, Hilo, HI 96720; 808-966-6175 (after 5:00 p.m. Mon. through Fri., all day Sat. and Sun.).

BEGINNERS, discouraged by too-fast "trainers"? Send $1.00 and a stamp for ease-of-flying ratings of over 20 well-known radio-control models. Jim Waterman, 3818 Deerfield Dr., San Antonio, TX 78218.

THE FLIGHT CADDY: Easy to follow field box plans. Holds all necessities. Send $3.00 to Ronald W. Partacz, 32 S. Rossler Ave., Cheektowaga, NY 14206.

AVIATION MAGAZINES from 1932 onward. *Model Airplane News, Flying Aces, Dare Devil Aces, Cross & Cockade, AAHS Journals, Air Progress,* etc. For seven-page list send a buck. John Woska #3040, 6559 W. Foxridge, Mission, KS 66202.

WANTED: J.T.#2 Buckeye ducted-fan kit or plans, sold by D&B Model Aircraft in 1976. Al Carion, 836 Pineneck Rd., Seaford, NY 11786.

FOR SALE: 12-page listing of model airplane mags., books, plans, etc. One dollar plus SASE with 37¢ stamp. J. Willard Vaughn, 506 Wadsworth St., Radford, VA 24141.

Send ad and payment to: Classifieds, *Model Airplane News,* 632 Danbury Rd., Wilton, CT 06897.

Non-commercial classified ads (commercial ads of any kind not accepted at this special rate). Rate: 15 words or less, $4.50 payable in advance. No charge for name and address. Additional words, 25¢ each.

Commercial classified ads (rate applies to anyone selling on a commercial basis—retailers, manufacturers, etc.). Rate: 50¢ per word, payable in advance. Count all initials, numbers, name, address, city and state, zip and phone number.

Closing date for either type of ad is the 15th of the third preceding month (for example, January 15th for the April issue). We do not furnish box numbers. If you would like your ad to run in more than one issue, multiply amount of payment by number of months that ad is to run.

It is not our policy to send sample copies or tear sheets.

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perceptions of noise or safety—this activity is no longer noisy and is, certainly, no more dangerous than golf or baseball.

I can't, with assurance, claim that R/Cers have any real political clout. But, whatever we have, it must be used. I am sure that AMA's 100,000 member level (or the circulation of any of the magazines devoted to the subject) does not represent our true size. No matter our numbers, what we need is a more aggressive approach to political bodies at the county, state, and federal levels. We are all taxpayers and voters—we are supporting other sport and recreational activities and it is time that our activity received some help. We should no longer take "no" as an answer. Even litigation against a public body should not be ruled out. Where a political entity discriminates it can be brought to task in the courts. Expensive, yes. Lengthy, yes, but we are talking survival here!

So, I suggest:

1. Where a field exists, conduct all flying in precise compliance to AMA's safety and operational codes. And, when a challenge arises against your right to use the existing field, be prepared to shoulder the expense and time to protect that right.

2. Go out of your way as an individual to speak positively about modeling anywhere you can; at Rotaries, schools, civic groups, and youth organizations—*sell model aviation.*

3. Be certain that full insurance protection is afforded to any public agency or private party that allows us to fly. That includes the AMA insurance or any personal or club policies we may have. I suspect that liability is our most recent and formidable nemesis and this is an area for the most extensive investigation.

4. Do everything possible to reduce noise, but don't slink away when a complaint comes. If someone claims we are out of line, *it must be proven*—the Omahawks had their problems with this one.

5. As a club, you have the combined strength to support the purchase of a field. A club of 30 to 40 members could, by combining their resources (say $500 a member a year—I'd pay that gladly) sustain a mortgage on farm property to the tune of $20,000 a year. Then you could fight for your rights as a property owner. And the property would appreciate in value over the years.

6. As individuals and clubs we must become more involved with public agencies that control recreational activities. And a "turn-down" must not be allowed to stand! Push, push, push; always with courtesy and always with a singular purpose.

Frankly what most of us look for will not really cost tax dollars. Given some open area, R/Cers will, through their own labor, develop the space as a flying area at no cost to the taxpayers. I believe we will be most effective in our efforts at the local level. But, in time, our local efforts can become a national trend that recognizes modeling as a great hobby/sport. There simply must be a way. Model aviation deserves a place in this over-taxed world; *start demanding that place of your legislators!*

We are looking for insights into the flying field problem and welcome your response in the area of your and your local club's efforts. Perhaps we can, in some way, collect the experiences of many to guide the efforts of those looking for that flying space.

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R/C NEWS

(Continued from page 127)

Help Is On The Way

The Academy of Model Aeronautics has recognized the problem of saving and acquiring flying fields. In the long run, a continuation of its efforts will help us all. I would like to see a more politically oriented approach but we can't expect AMA to do it all. However, we must support its efforts; we are not the National Rifle Association but we do have a strong national organization that can make a difference.

We also need a positive program in the national media by the AMA. The more we tell our story in magazines and on TV, the greater our chances are to be recognized as a legitimate sport. One of the first visible signs of AMA's efforts came in a story on modeling in the *National Geographic* of July 1986. Titled, "Model Airplanes: To Dream, to Build...And Then to Fly," the 13-page color spread presents an easily understood presentation of model aviation for the uninitiated. It was developed at the 1985 AMA Nationals held at Westover Air Force Base in Chicopee, Massachusetts. I believe the piece in such a prestigious national publication (the first I can remember in 30 years or more) can only help. It is well done, visually attractive, and accurate. We need more of this and I compliment AMA for getting our activity this kind of national coverage.

All I ask further are some in-roads into TV sports coverage. The more our story is told in popular media, the more effect our letters to legislators will have.

Till next month.

Art Schroeder, c/o *Model Airplane News,* 632 Danbury Rd., Wilton, CT 06897. ■

EDITORIAL

(Continued from page 7)

you asked Joe what he did, he would say he was just a modeler. Well, he was famous for more than that, obviously, but I think that Joe would prefer to be remembered simply that way. We will miss him.

THIS MONTH. The central theme of this issue is fun, and what better airplane could you pick for that effort than the big Hots. This is one fine-flying airplane and it goes together fast. Dick Phillips went to the IMAA festival and Michigan will never be the same. His report on the giant-plane bash is included. Craig Hath checks out a new helicopter, the fabulous Circus Cyclone, and if that isn't enough, George Woods is still chasing his tail with his new Top Flite Holy Smoke. There's a bundle of great modeling tips and we're sure you'll like this issue. ■